IRON & COAL

THE IRON AND COAL TRADES' REVIEW

VOL. 188 Offices: John Adam House, 225 John Adam Street, London, W.C.2 Registered as a Newspaper
No. 4824 LONDON: FRIDAY, JULY 28, 1961 Amn. Subscription (Abroad only)

W-D

SMOKELESS CHARGING

Coke Ovens can be charged Smokelessly by the W-D Sequential System and Equipment with a Single Control Panel operating Lid Lifting, Coal Charging and Lid Replacement.

Photographs by permission of the National Coal Board (East Midlands Division)

British Patent Application Nos. 38434/59 · 43573/59 · 8540/57

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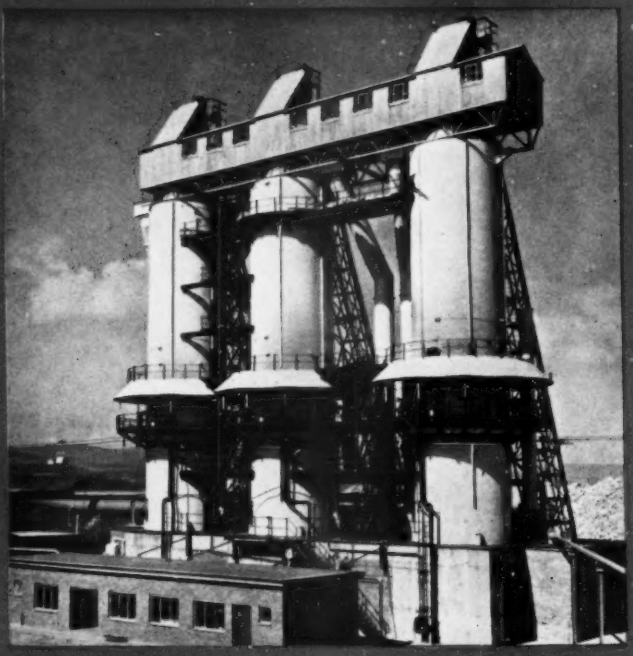

PRIEST LIME BURNING PLANT

The Lime Plant shown here has recently been installed at the Maydown Works of Carbide Industries Limited, near Londonderry, for producing burnt lime for carbide manufacture.

Each Kiln, producing 75 tons of burnt lime a day, is fired by gas supplied from a carbide furnace or alternatively by a mixture of this gas and coke producer gas.

The Kilns incorporate all the latest operational developments including automatic charging and discharging.

We specialise in the design and construction of:—

Open Hearth Furnaces
Soaking Pits of all types
Continuous Multi-zone Bloom and Slab Re-heating Furnaces
Continuous Bogie type Ingot and Slab Heating Furnaces
Furnaces for Aluminium Melting, Coil Annealing and Slab Re-heating
Forge and Heat Treatment Furnaces
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Shipyard Plate and Bar Furnaces
Modern Lime Burning Kilns

PRIEST

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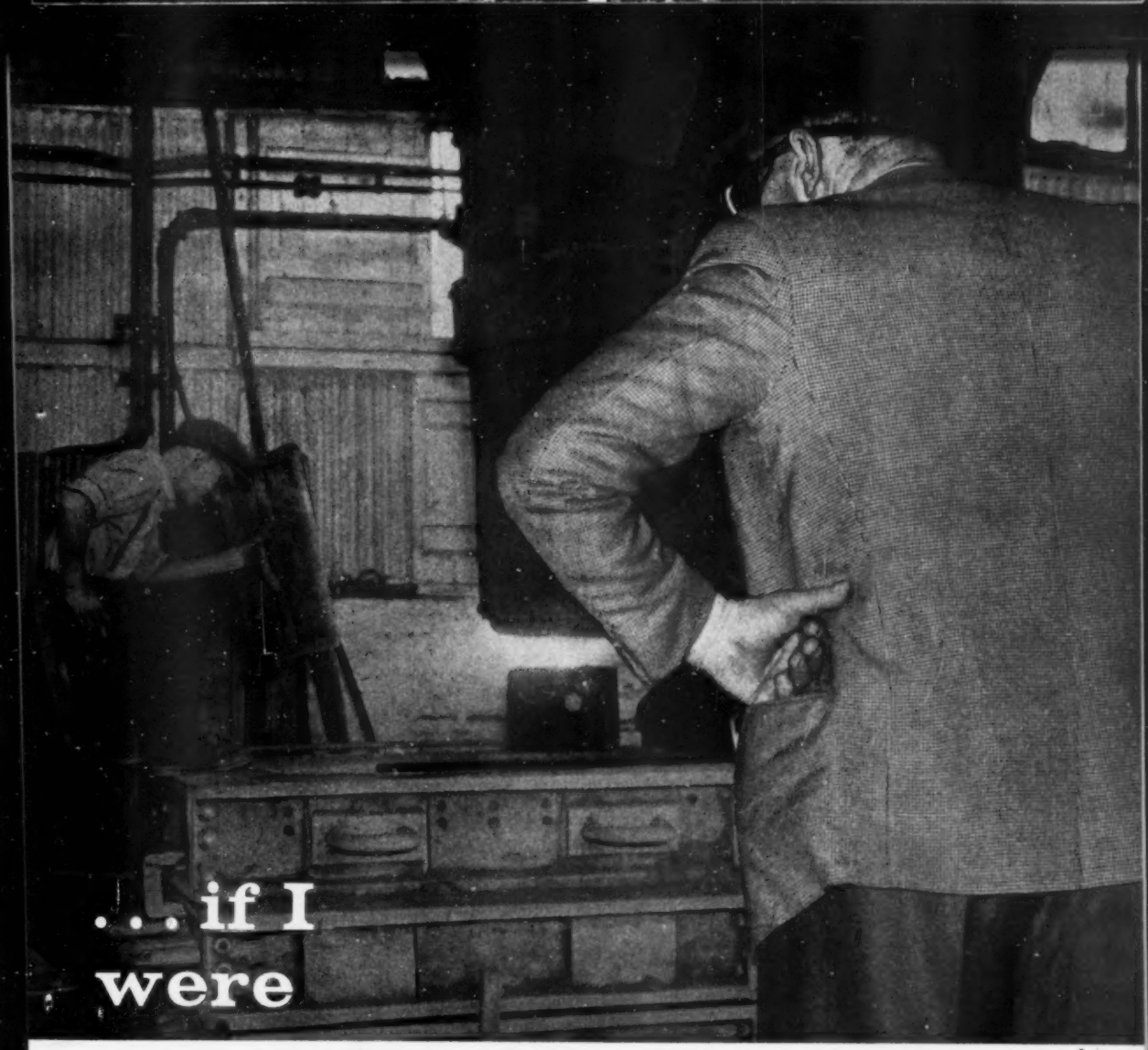

a Q.C.

". . .'Members of the Jury' I'd begin—and I reckon that would be my lot.

"You want a cool, calculating brain to tackle a job like that. Every step planned in advance—on your toes every minute of the day and heaven help the client if you make a mistake.

"A bit like casting a roll when you come to think of it—except for the talking. Always one move in front of the metal, every detail worked out to a hair-breadth and all the time Charlie, the crane driver, is sitting in his box like a blooming judge.

"As for the Jury? Well, I reckon all of us at AW fill that bill, but speeches won't sway us—it's the **result** that counts here."

CLOSELOY ROLLS – perfection in Roll technique

AW

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FULL BORE HIGH PRESSURE MINOR VALVE

For use where Full Bore is a necessity, in conjunction with LINDLEY "Full-Bore" Nipples, Hose Couplings, etc.

In response to requests for increased water supply on infusion, impulse firing, etc., we are pleased, after exhaustive tests, to offer with full confidence our specially designed Full Bore equipment.

Same robust construction, with Stainless Steel internal components, as Lindley Standard Minor Valve.

Working Pressure up to 5,000 lbs. p.s.i.

Sizes :— $\frac{3}{8}$", $\frac{1}{2}$", $\frac{3}{4}$", 1".

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MARK 11 MINOR VALVE

Pre-adjustable restrictor valve to provide variable small quantities of water from high pressure range. Fitted with safety valve for hose protection.

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WATER STEMMING BAG FILLER

Specially designed for filling Water Stemming Bags underground with attachment for quick and easy filling.

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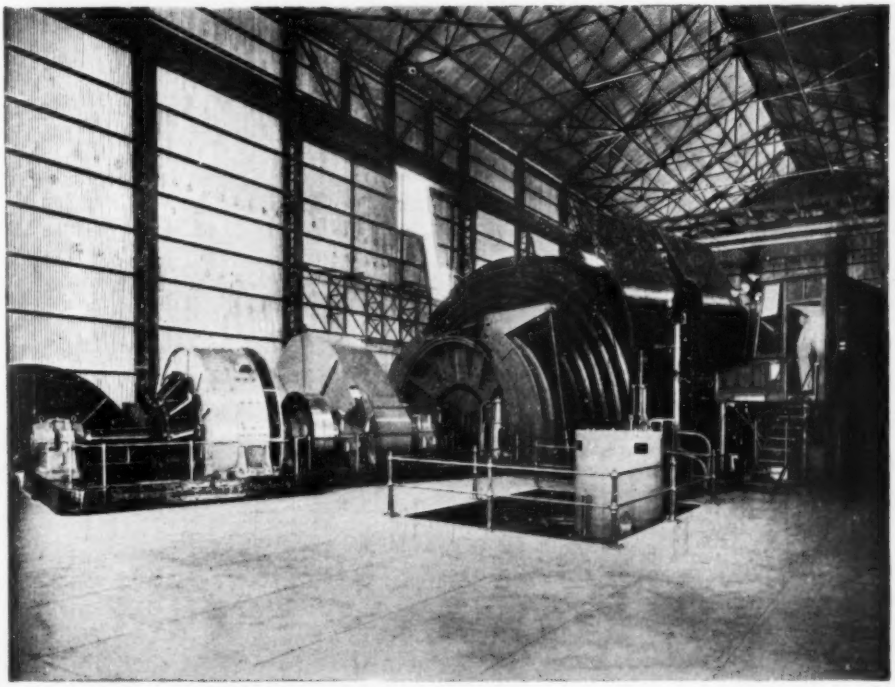

Gear Driven, Double Conical Drum Electric Winder.
Large dia. of Drums 36ft. Depth of Shaft 6,000ft.
This large Winder was one of several recently installed in South Africa

Steam and Electric
WINDERS

Also Makers of Air Compressors & Hydraulic Plant
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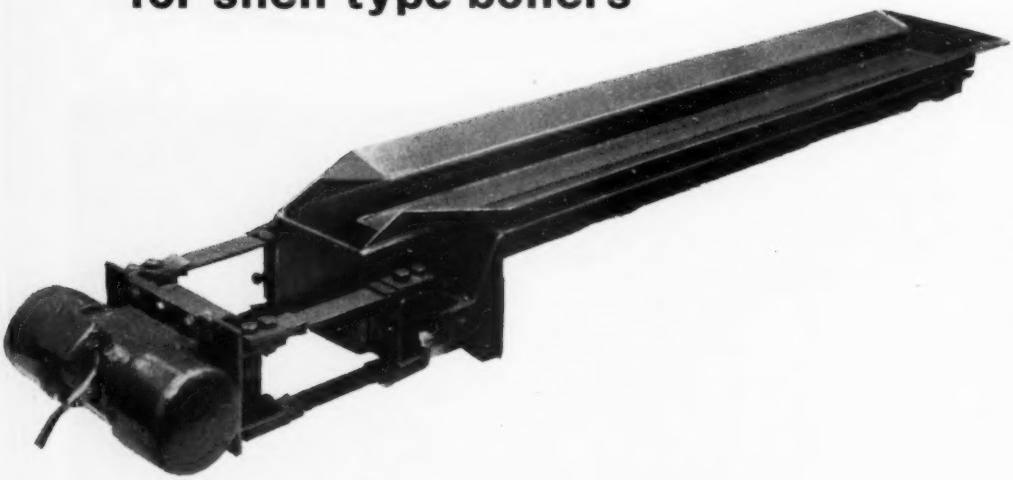
Thompson-Triumph

VIBRATORY ASH EXTRACTOR

for shell type boilers



A simple method of removing ash from shell boilers, preventing build up of ash at the rear of the stoker, and obviating losses and inefficiency due to frequent hand ashing. The ash is continuously discharged by means of a vibrating tray beneath the stoker, a single rotary electric vibrator unit providing the high frequency impulses. Very few moving parts and virtually none to wear are among the many advantages the vibratory ash extractor has over the conventional ash conveyor.

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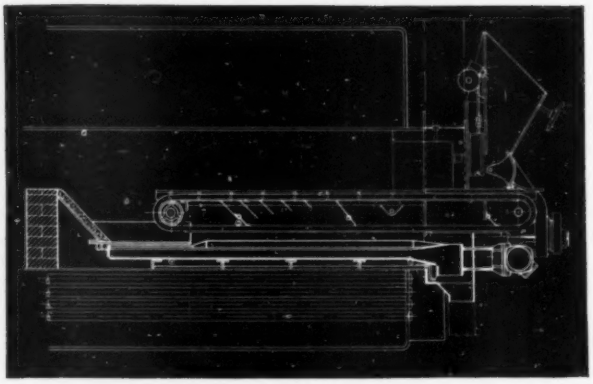

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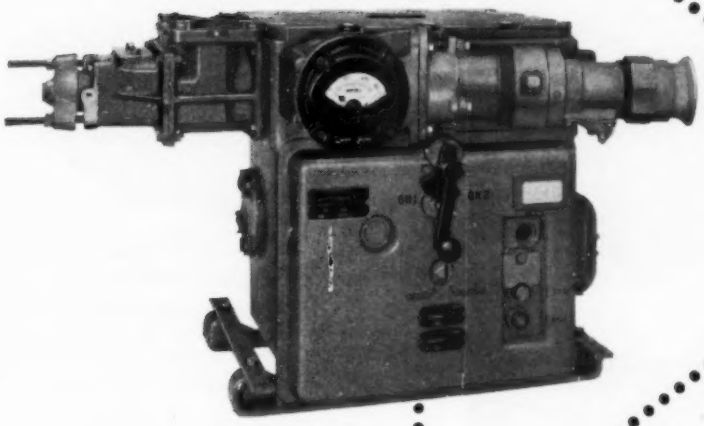
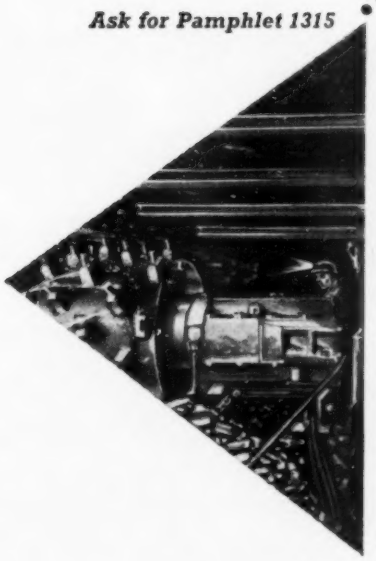


Ask for Pamphlet 1315



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Single or multi-bolt cover. Buxton certified flameproof. Intrinsically safe control to N.C.B. Specification P130/1955. Intrinsically safe earth-fault electrical lock-out circuit. Provision for 30-ampere bolted, 100-ampere restrained, or 200-ampere restrained plug and socket

150 amperes 400-650 volts 3-phase 50 cycles

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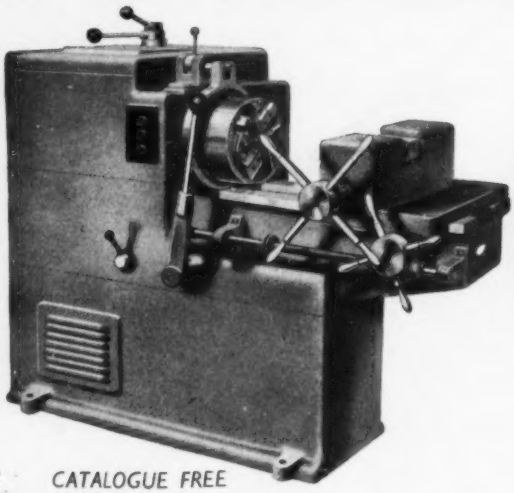

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These machines have been especially designed for quantity production work, and they are capable of extremely fast rates of output. Outstanding features include Tangential Die Head, Hand and Automatic Releasing Motion, Automatic Closing Device, Automatic Pump, etc.

A full range of sizes are available

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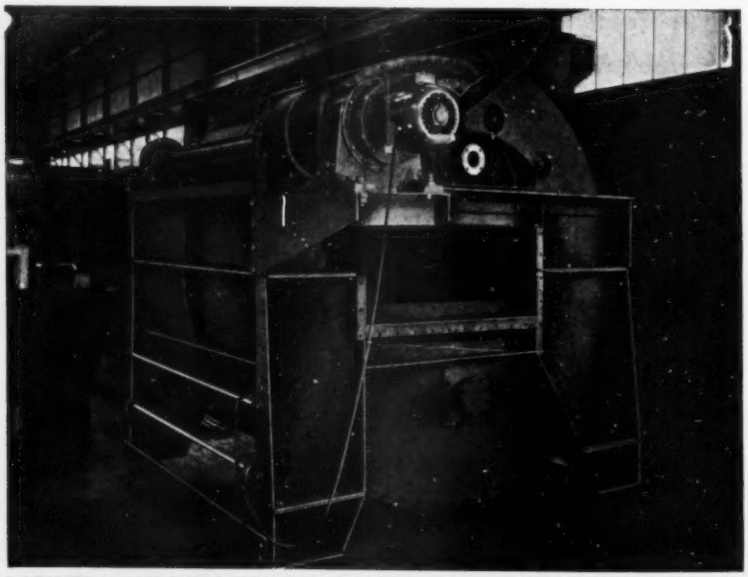

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QH ANTI-BREAKAGE TRUNKING

(Patents applied for)

eliminates the bulk movement of bunkered coal and converts a bunker into a by-pass unit; it must of course be combined with a Qualter Hall BUNKER SPIRAL CHUTE for bunker filling.

Details of how this system provides really efficient bunkering are given in two newly-printed Qualter Hall publications.

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★ LARGER COAL
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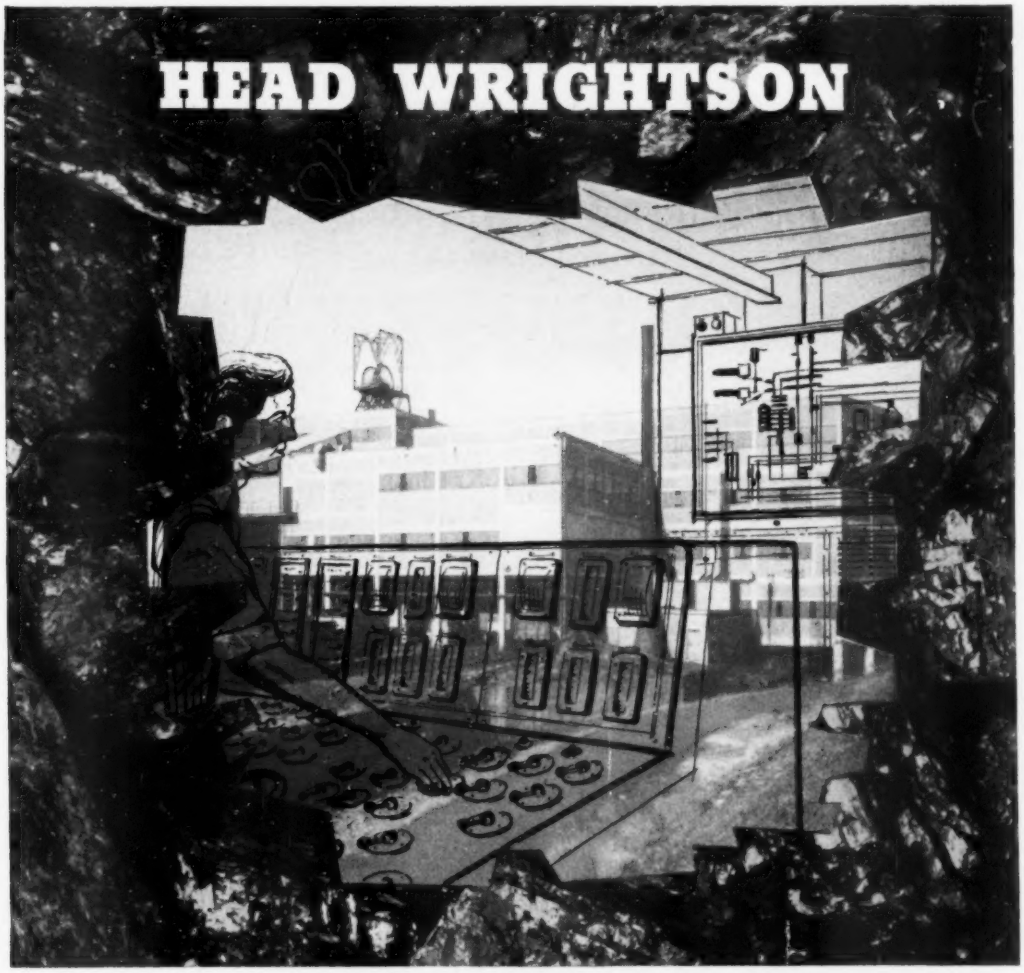

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P.5871

THYSSEN

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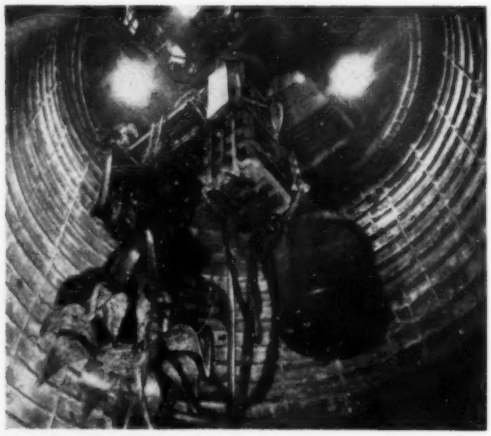
View from the Shaft Bottom, showing the underside of the Sinking Stage, 105 cubic feet capacity bowk and lashing gear, including grab and driver's cabin, etc., in use at Kellingley Colliery, Yorkshire, where we established the British Shaft Sinking Record of 339ft. of completed 24ft. internal diameter concrete lined shaft in January, 1961.



View of the Roadway at Blaengwrach (New Drift), South Wales where, in cross measure coal strata, we established the British Tunnelling Record of 108 yards advance in one week during February, 1961.

(Photographs by courtesy of the National Coal Board)

SHAFT SINKING, TUNNELLING, CEMENTATION, SPECIALISTS IN ALL TYPES OF UNDERGROUND DEVELOPMENT WORK

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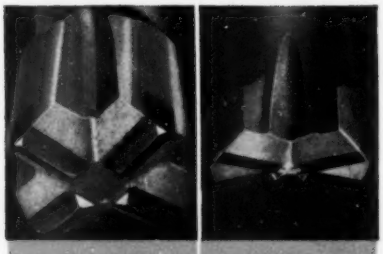

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Look at these performances achieved with the Gardner-Denver Air Trac using the revolutionary PR123J Deep Hole Drill featuring independent rotation. In conjunction with

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The performances quoted below are overall drilling speeds and include setting up, drilling, adding and withdrawing rods.

Location	Type of Ground	Depth	Dia.	Overall Drilling Speeds
South Wales	Medium granite	100 ft.	4"	40 ft. per hour
North Wales	Hard, tough, granite	90 ft.	4"	28 ft. per hour
Derbyshire	Medium limestone	80 ft.	3"	60 ft. per hour
Leicestershire	Hard granite	60 ft.	4"	30 ft. per hour

MINE CAR TIPPLERS
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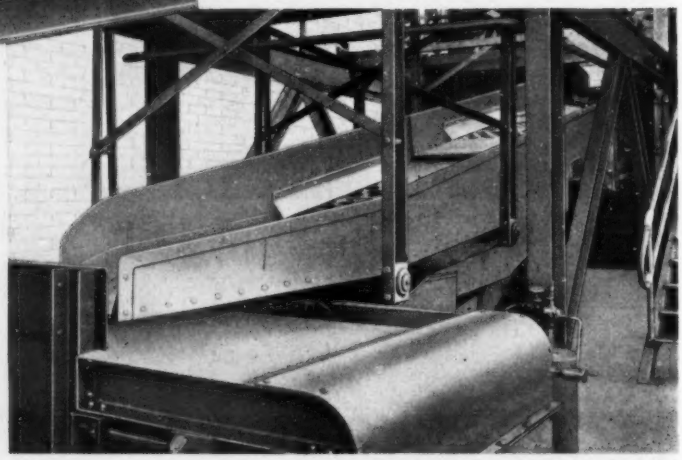

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Also complete COAL CLEANING AND HANDLING PLANTS of the most efficient type including COAL WASHERIES of any capacity designed to clean RUN-OF-MINE COAL arranged with
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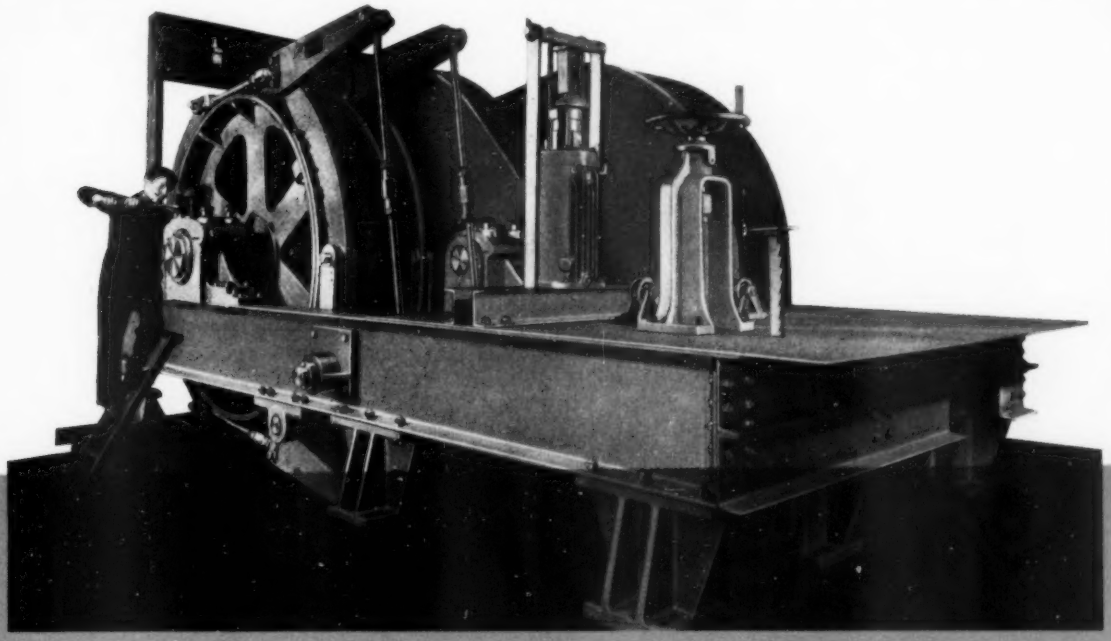

250 h.p. Electrically Driven Endless Rope Manriding Haulage

Motor speed 488 R.P.M. Rope speed 6 M.P.H. 7′ – 0″ dia. surge pulley.

Frame 19′ – 0″ × 9′ – 6½″.

"Worrall" Overspeed Device and all electrical Limit Switches.

Thruster operated emergency incorporated in the main brake gear.

First motion Vee rope drive. Machine Cut Gear Wheels.

MAKERS OF ELECTRICALLY DRIVEN MAN RIDING OR MINERAL HAULAGE GEAR UP TO 300 H.P.
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HEADGEAR PULLEYS UP TO 20 FT. DIAMETER, WHOLE OR IN HALVES.
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PROMPT ATTENTION TO BREAKDOWNS AND REPAIRS.
FACILITIES FOR MACHINING UP TO 22 FT. DIAMETER,
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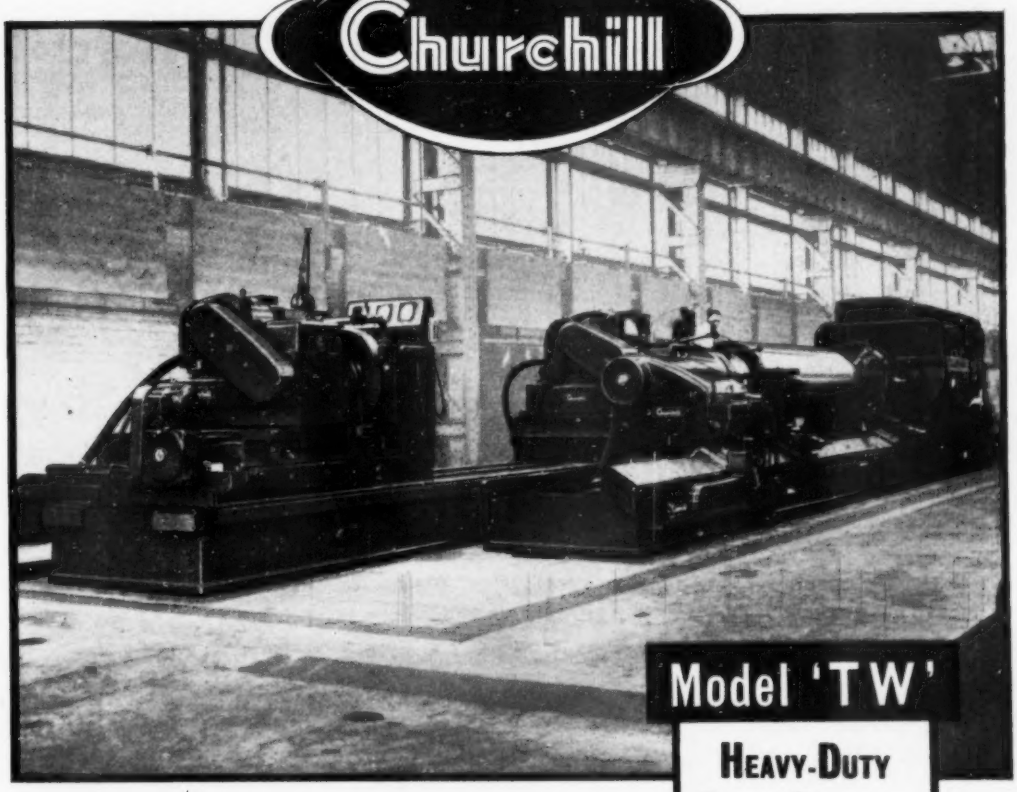

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HEAVY-DUTY ROLL GRINDING MACHINES
FOR
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Built in three swing capacities: 48, 60, and 72 ins. These heavy-duty Churchill traversing wheelhead Roll Grinders have been designed in collaboration with leading firms in the Iron and Steel Industry to give accuracy and finish together with high metal removal.
They are fitted with Churchill Patented Automatic Electronic Feed and Cambering Mechanism and, if required, with Auxiliary Wheelhead for grinding taper necks.

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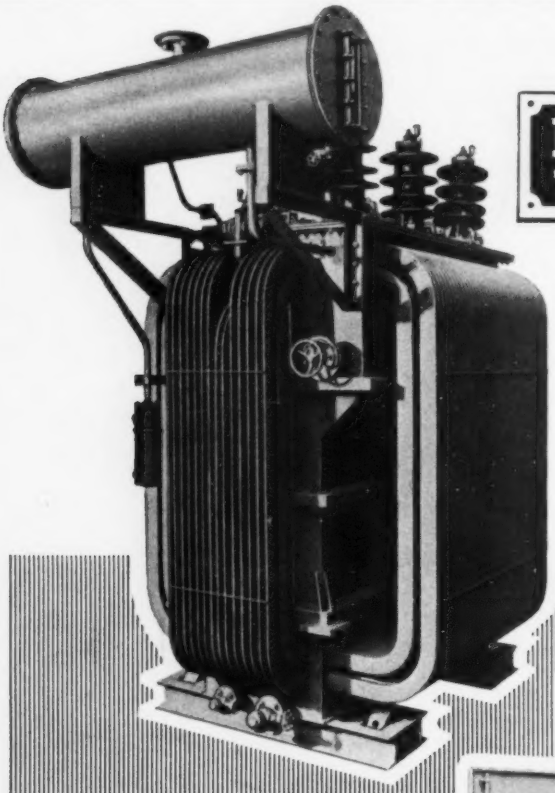

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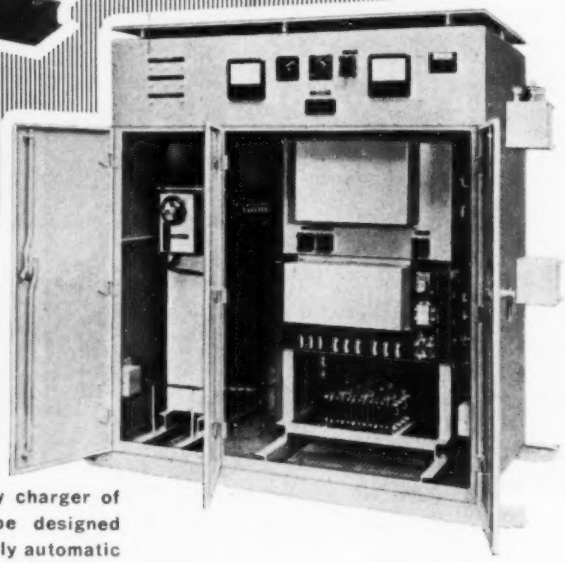
TRANSFORMERS

A typical 1,500 kVA 33/11 kV Hackbridge distribution transformer



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Hewittic battery charger of the silicon type designed to provide a fully automatic constant current two-rate charging characteristic to a battery locomotive

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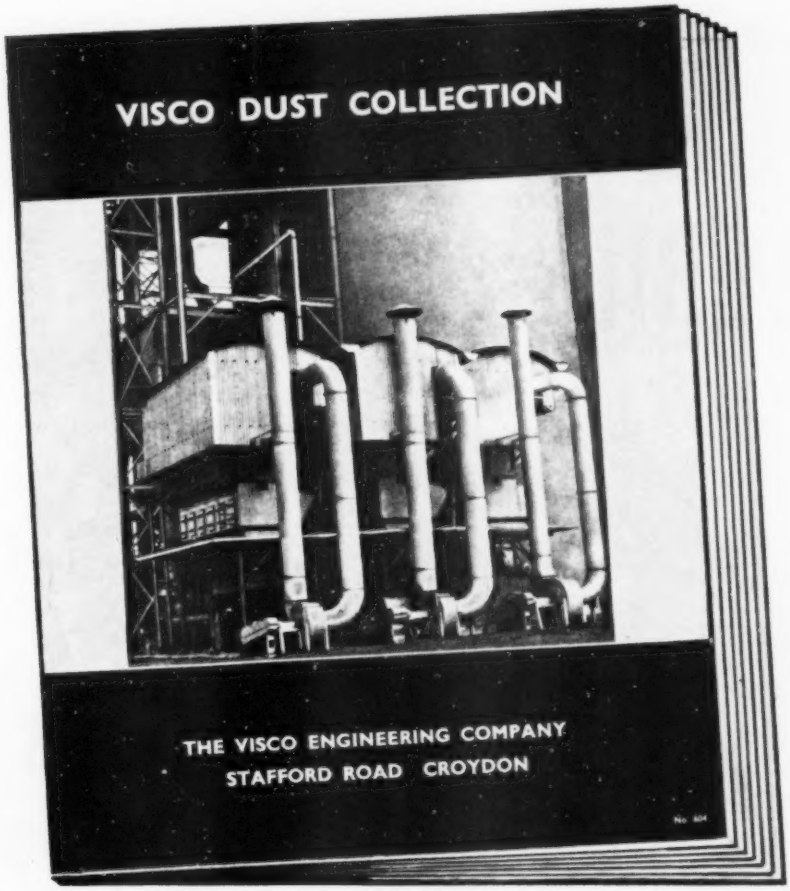

A useful booklet on Dust Control

If you have a dust recovery and powder handling problem, you will find our latest brochure useful and interesting. In it we discuss dust collection in general and give numerous examples of the application of our dust recovery equipment. The information in the brochure is based on many years' experience in dealing with practically every kind of material in powder or fibrous form. It also contains illustrations showing different types of equipment varying from large centralized plant to small individual units. Brochure available on request to THE VISCO ENGINEERING CO. LTD., Stafford Road, CROYDON. Croydon 4181.

For Modern Dust Collection

VISCO

FWS

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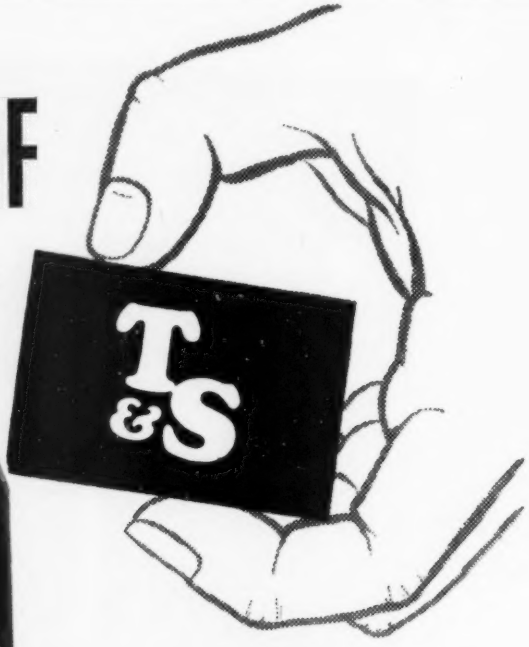

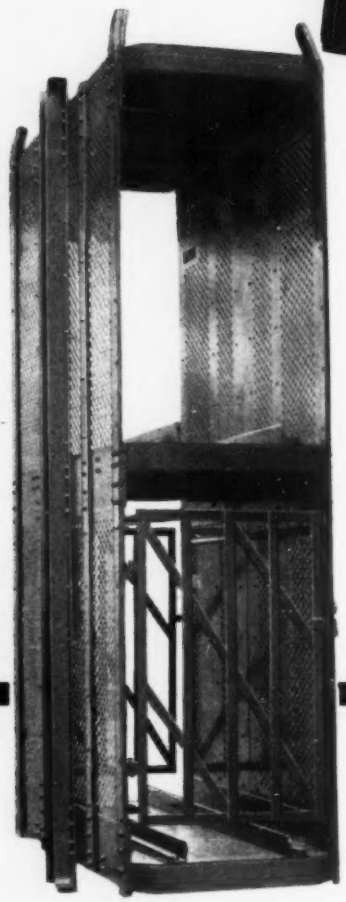

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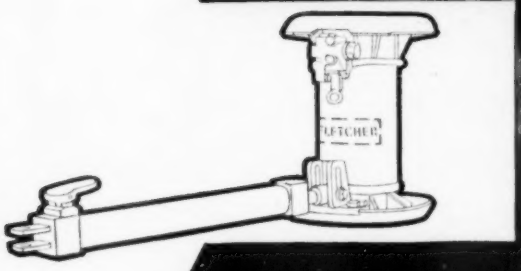
FLETCHER DESFORD CHOCKS

in action



Photograph by courtesy NCB

Following successful installations in the East Midlands Division, the Fletcher Desford hydraulic chock has gained a reputation for reliability.

50 and 100 ton versions: 6″ to 18″ stroke at 2″ intervals.

Fully approved by N.C.B —H.15 and H.11.

Ancillary equipment by Fletcher includes:

double-acting hydraulic ram up to 2′-6″ stroke

detachable ram anchor brackets

extension pieces 6″ & 12″

Full technical information from

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Bathgate Wedge Props are designed to do only one job — and do it as efficiently as possible at low cost. The Wedge angle is carefully calculated to sustain the heaviest of loads, and the upright is of the famous TWIN-TROF section. These props are light, easy to handle, and extremely fast in operation.

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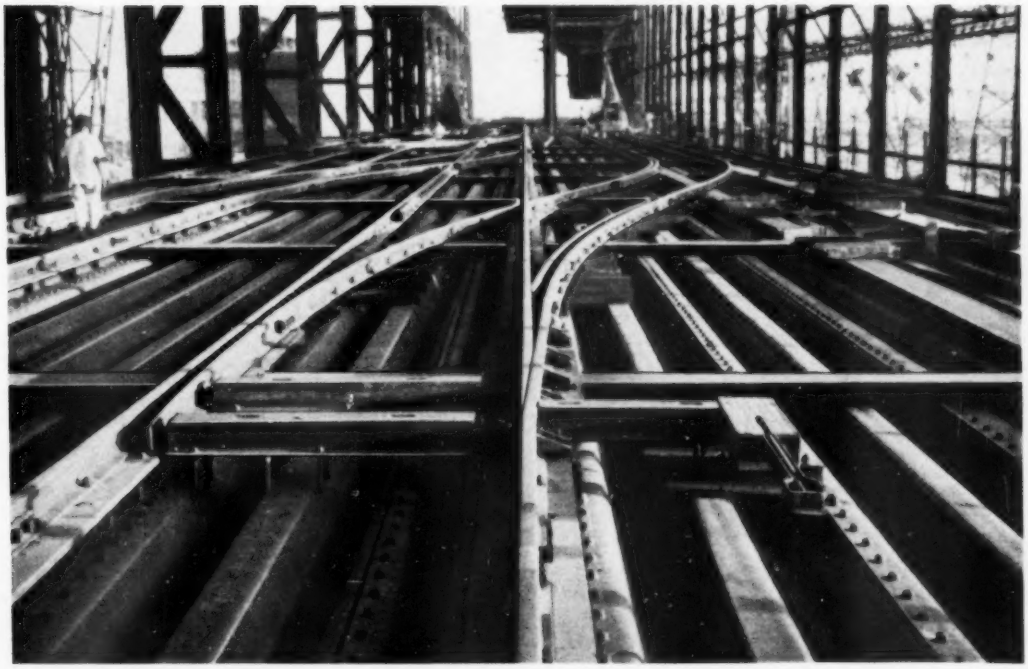
WP 70

TRACKWORK FOR STEELWORKS



Turnout No. 15 at Durgapur, ready for concreting. In all there were 26 built-up turnouts, four cast manganese diamonds and 6 sets of manganese charger crossings, in a total of 2,255 feet of rail.

The high cost of modern steel production makes it necessary to work continuously at full capacity with no interruption to the flow. To meet this requirement the permanent way plays a vital role in the smooth running of the plant, and must be of the highest quality, requiring minimum maintenance. Edgar Allen & Co. Limited were entrusted with the manufacture of the heavy duty crossings and the entire trackwork for the furnace and stock bay platforms and their approaches, much of it in Imperial manganese steel, for Dorman Long & Co. Ltd., Steel Company of Wales, John Summers & Sons Ltd. and Colvilles Ltd. and other steel plants. At the new Durgapur steelworks in India they have supplied the trackwork for the melting shop and marshalling bays which are illustrated above.

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EDGAR ALLEN & CO. LTD
IMPERIAL STEEL WORKS · SHEFFIELD 9

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DK 9/51—For Methane Drainage, Proving and de-watering in normal strata. Can also be fitted with two-speed gear box for Diamond Coring.

HBM50/HY—For boring holes up to 32" dia. This electro hydraulic machine is used for Ventilation Linkages, Staple Shafts and Stowage Chutes.

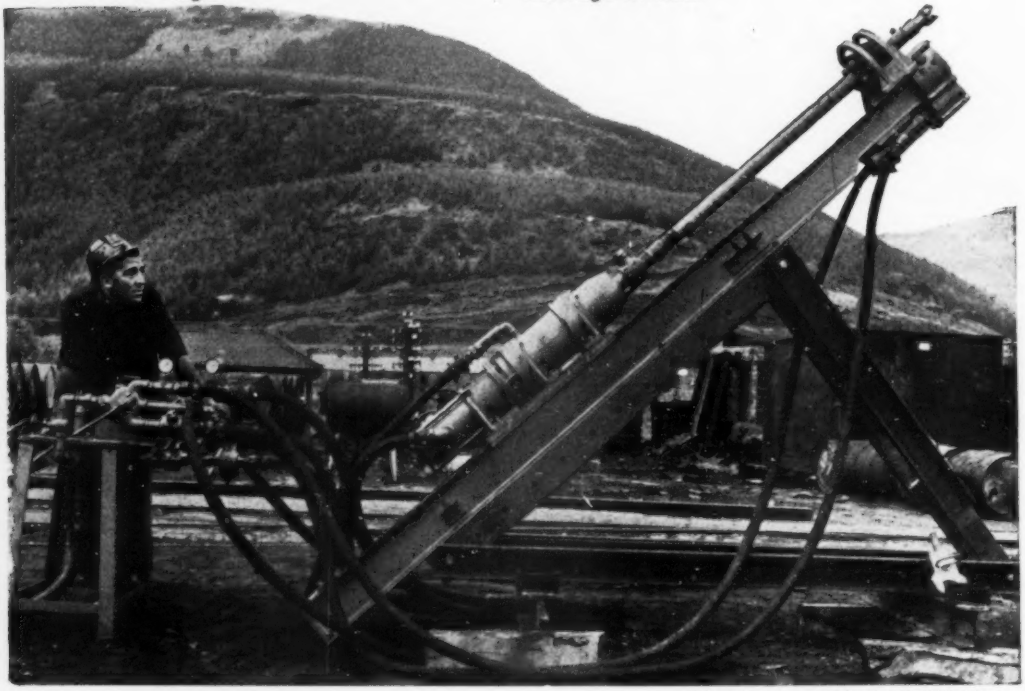

Photo by courtesy of the N.C.B. S.W.2 Area

DK 9/6 8—S rotary/rotary percussive drilling machine specially designed for Methane Drainage drillings in the harder rocks. This type of drilling does away with excessive tungsten carbide bitwear as well as the low penetration rates associated with the use of diamond assemblies when drilling in most of the harder rocks.

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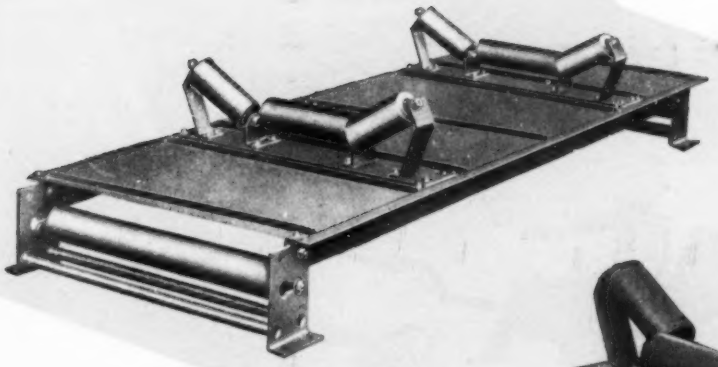

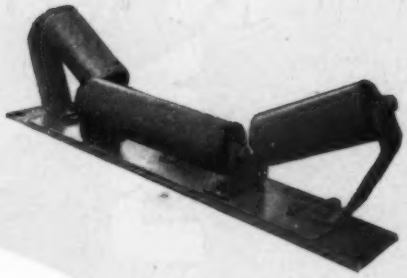

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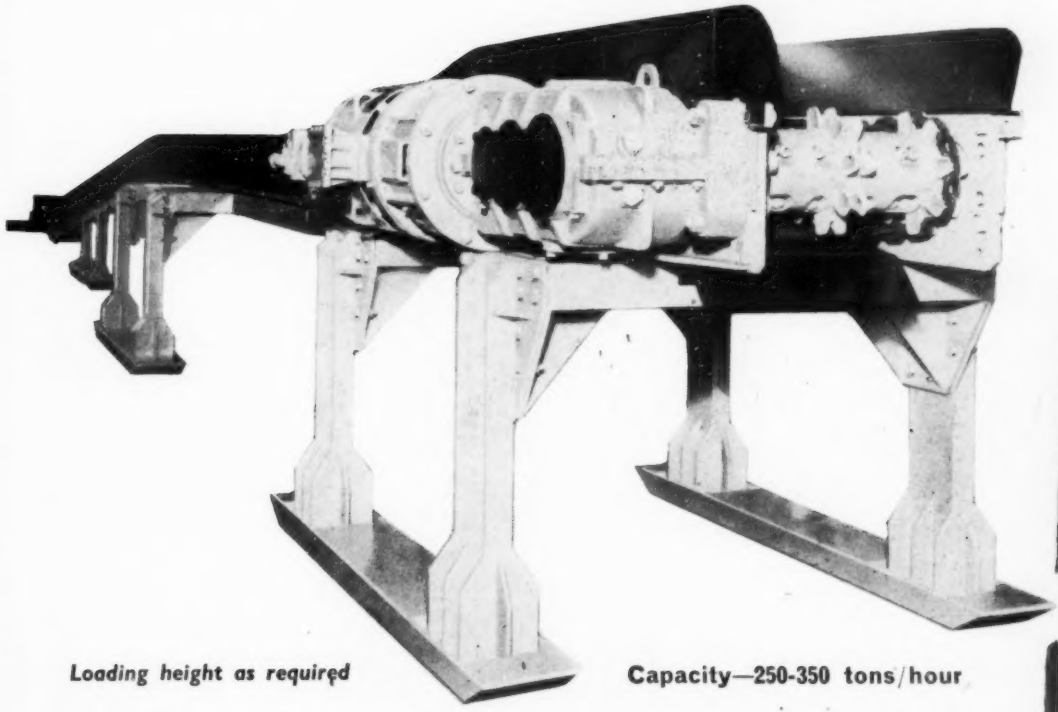

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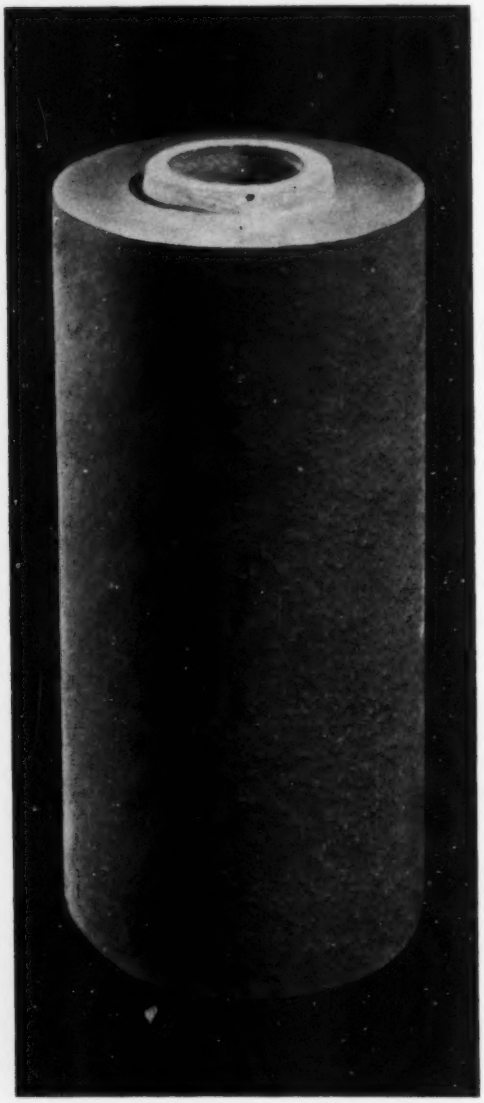

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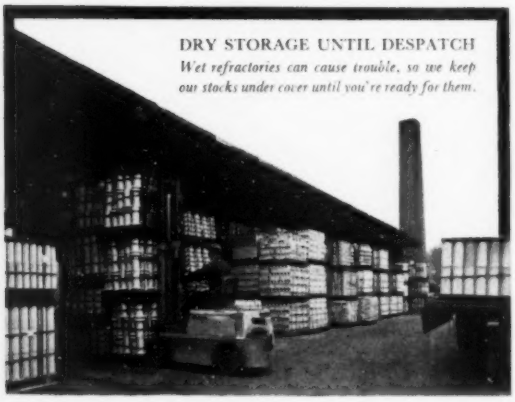
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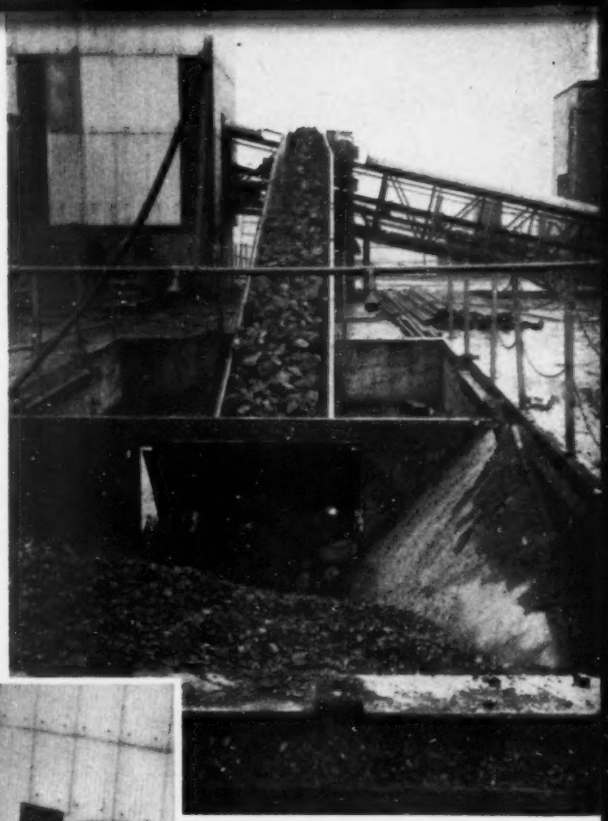

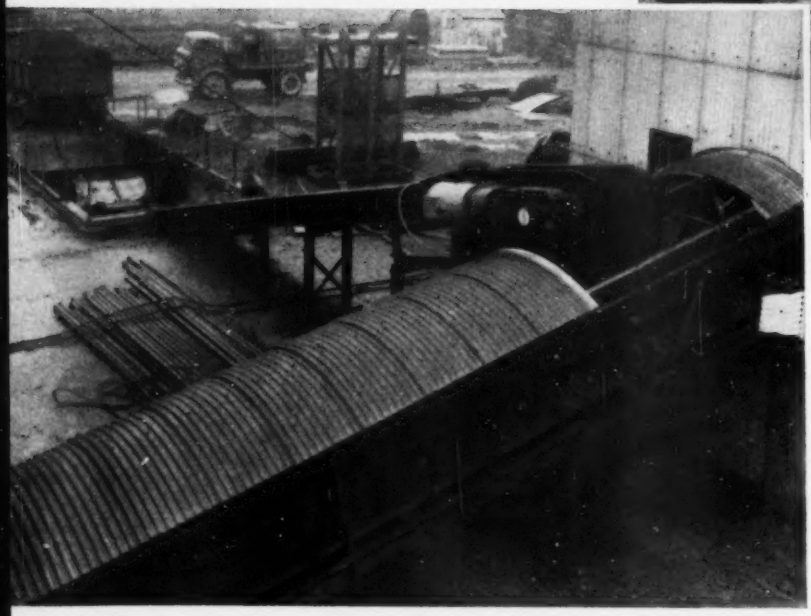

Photographs by courtesy of the National Coal Board.

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Scraper Chain Conveyors are solving the problem of unscreened stock coal at a number of Midland Collieries. Coal is brought from the stock ground by lorries and tipped into a sunken hopper from which it is taken to the screens by a MECO Chain Conveyor which delivers to a Belt Conveyor already handling current production.

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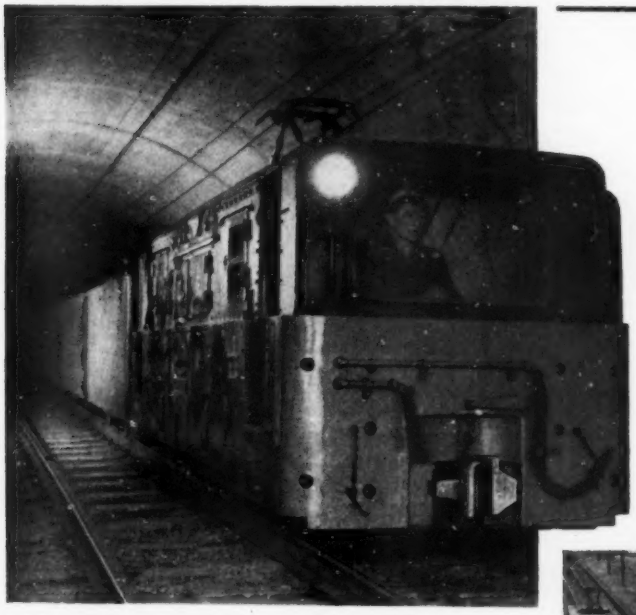
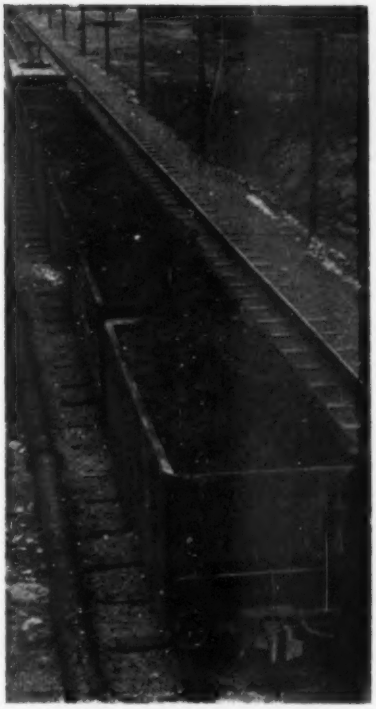


Why are ESC Willison Automatic Couplers used in Iron Ore Mines?



Photos by courtesy of Stewarts & Lloyds Minerals Ltd.

For exactly the same reasons that they are also used in Coal mines, Steelworks and Hydro-electric tunnelling.

- They couple automatically when buffed together. This ensures safety to haulage personnel by eliminating the necessity for going between cars.
- They can be "lock-set" to permit buffing without coupling.
- Rotary tippling of cars without uncoupling can be arranged.
- The angle of mated couplers on curves is limited only by the design of the car.
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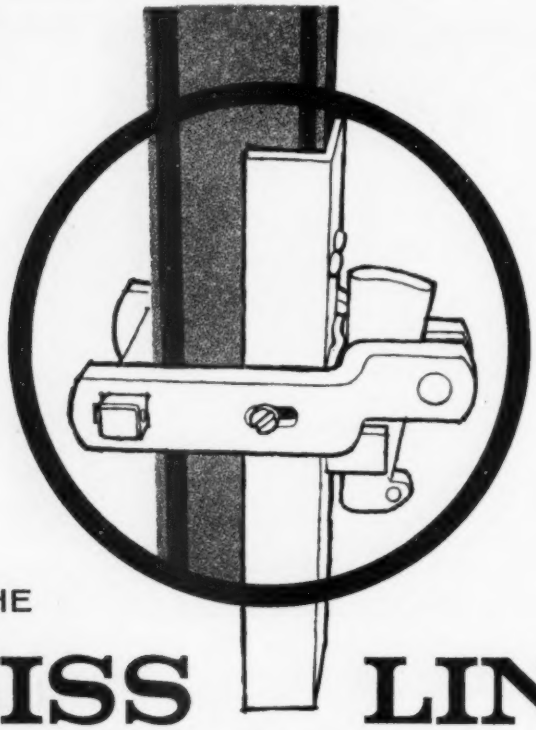

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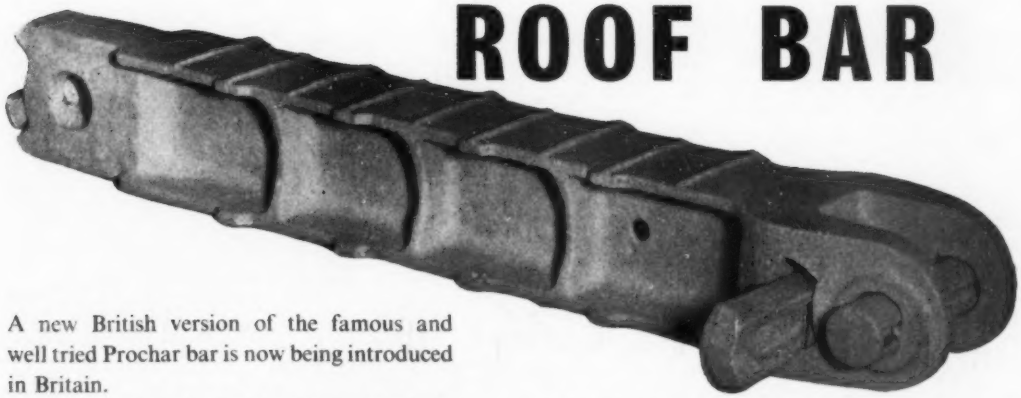

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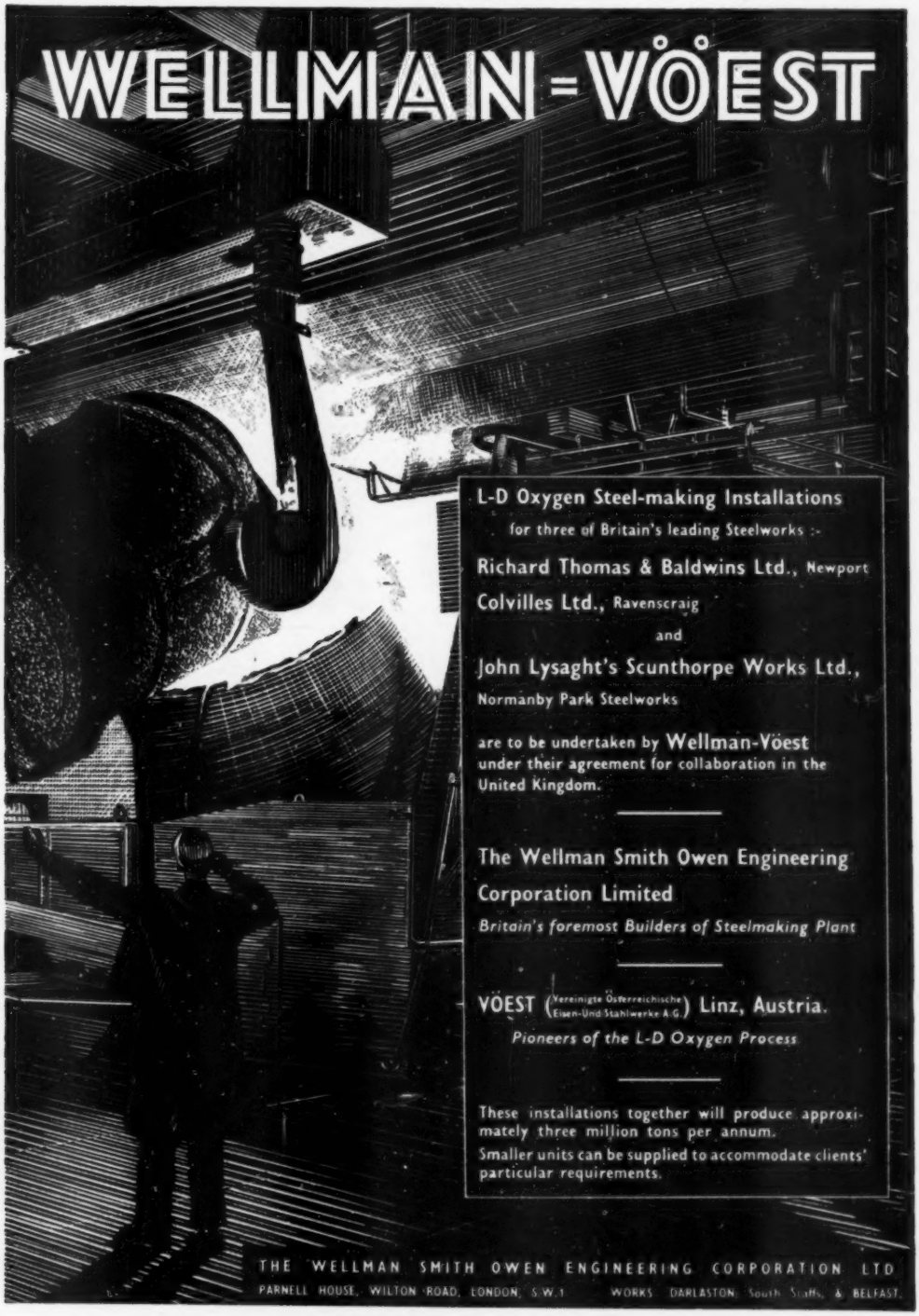
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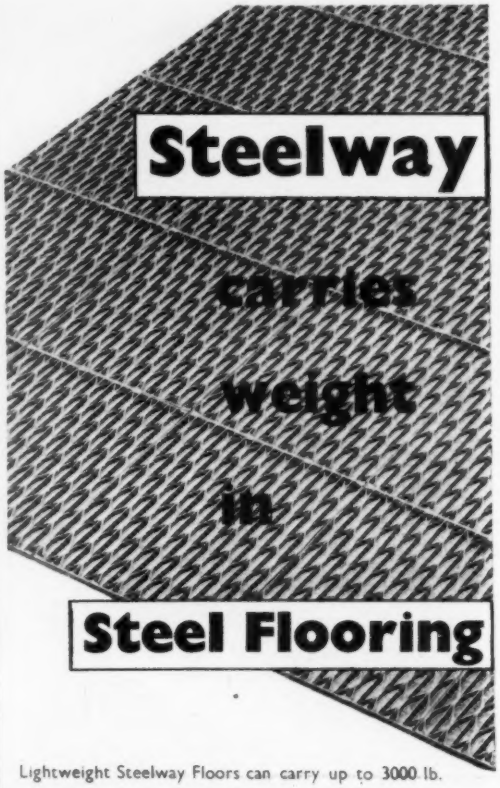

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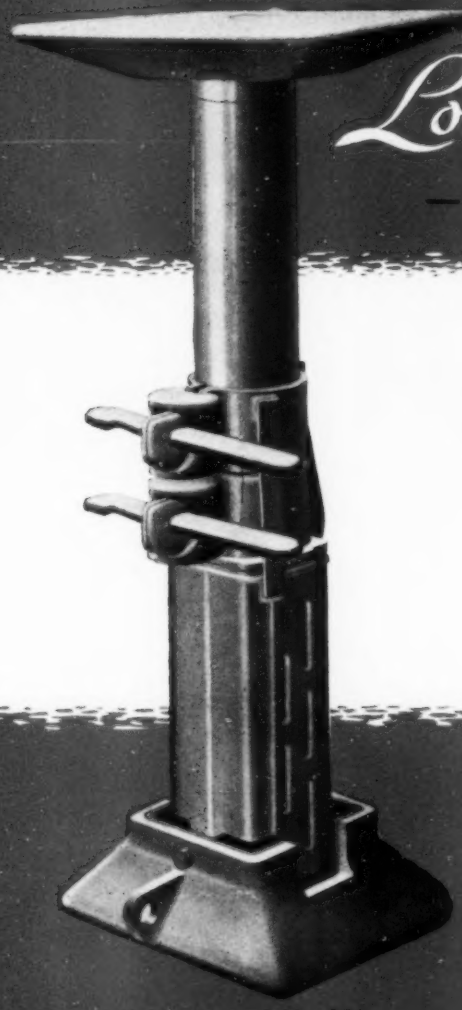

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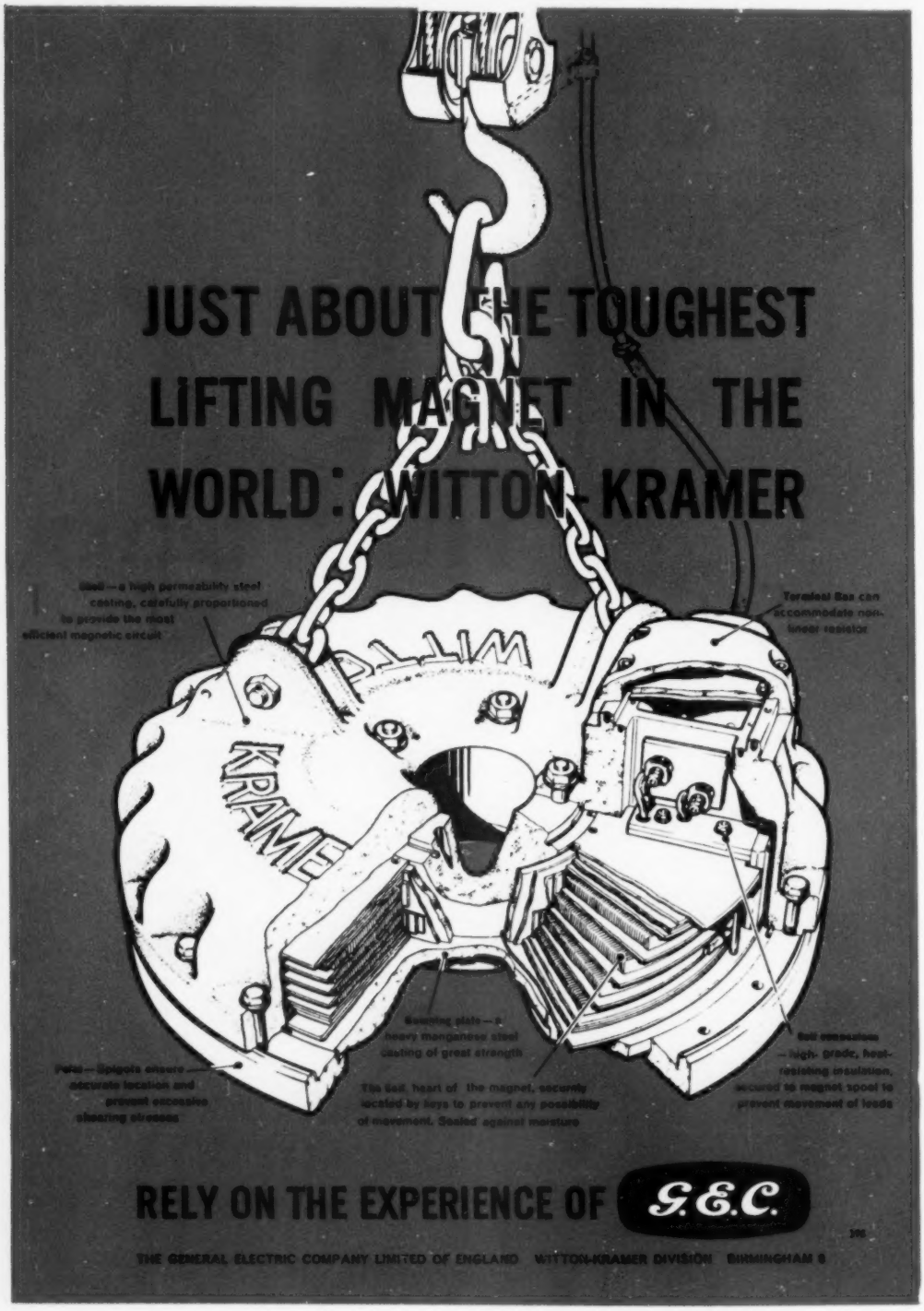
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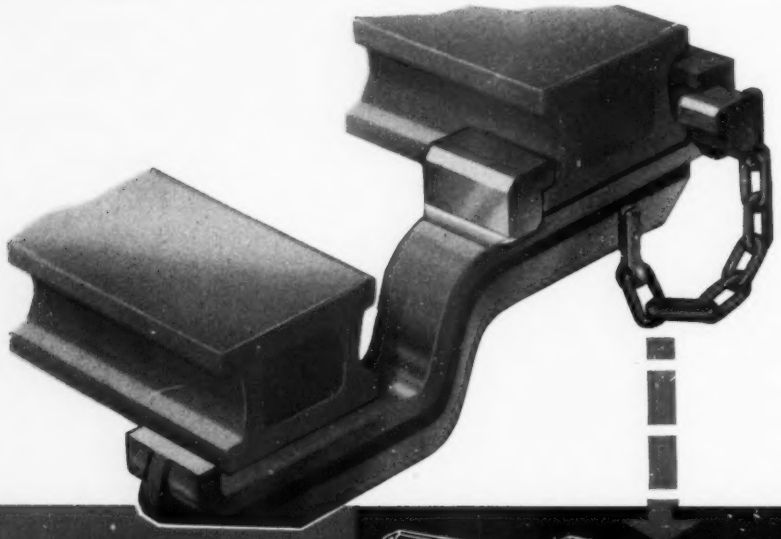

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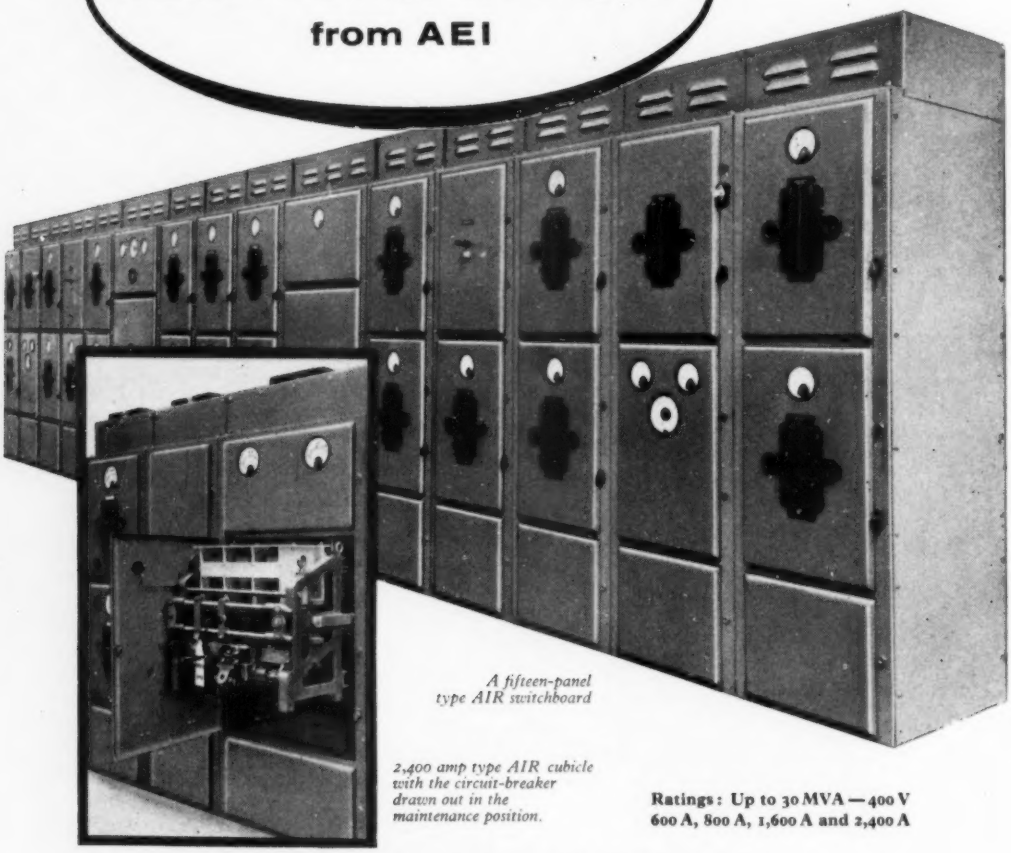

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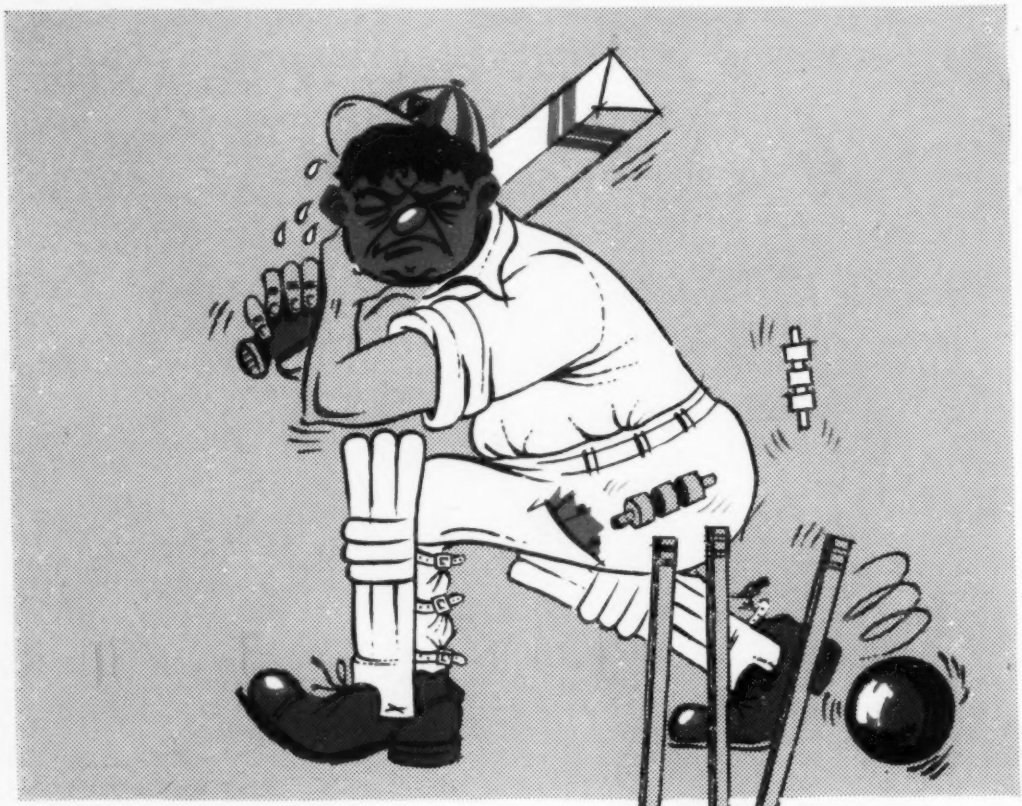

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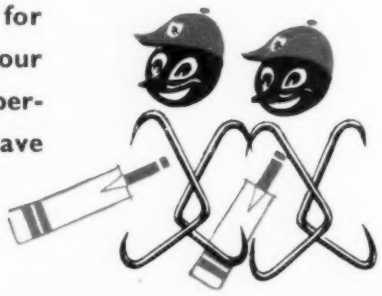

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Vol. 183
No. 4854

IRON & COAL

ESTABLISHED

THE IRON AND COAL TRADES' REVIEW

JULY 28, 1961

ESTABLISHED 1866
Incorporating "STEEL and IRON" and "COAL"

Organ of the National Association of Colliery Managers and the Association of Colliery Managers in India

Published each Friday

Annual Subscriptions: United Kingdom....52s. Abroad....60s. Payable in advance.

Editor: F. H. HARLEY
Assistant Editor: P. E. CARDEN
Metallurgical Editor: C. W. J. CRAWFORD, A.I.M.
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Production Manager: R. J. LOVELL
Publisher: H. J. DWYER
Circulation Manager: E. T. GRIFFITHS

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published by
INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LTD.

Directors:
F. BARRINGTON HOOPER *Managing Director*
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JOHN ADAM HOUSE, 17-19, JOHN ADAM STREET, ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (Private Branch Exchange)
Telegraphic Address: "Zacatecas, Rand, London."

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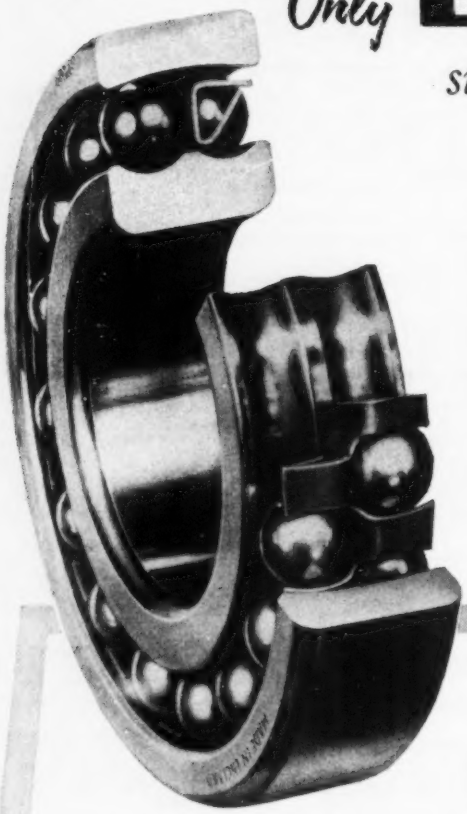

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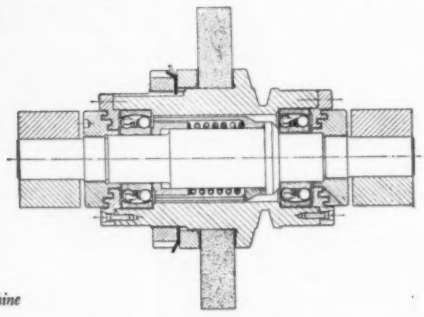

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IRON & COAL
THE IRON AND COAL TRADES' REVIEW

Vol. 183 July 28, 1961 No. 4,854

Pilot Plant Research

ELSEWHERE in this issue we report on the research being carried out by BISRA, the organization set up to serve the steel industry of the United Kingdom. BISRA's activities, however, are far from representing the entire research effort of the iron and steel industry, and it is therefore useful to consider the overall position and ask whether enough is being done.

In addition to supporting the work of BISRA and the other research associations connected less directly with the industry to the extent of about £1,000,000 a year, various steel companies have research departments to cover their own specific interests. Thus, according to the British Iron and Steel Federation's annual report for 1960, the total research expenditure on iron and steel is about £5,000,000 a year. This is equal to less than 1 per cent. of the value of the steel made in 1960. In some other major industries the proportion is much higher; in the electrical industry it is 10 per cent. and in the chemical industry 6 per cent.

Irrespective of other industries, the question is whether there is any facet of iron and steel research which is not adequately financed at present. More pilot plant facilities certainly would be useful. There has been much criticism about the small part this country has played in developing the new processes that have so altered the world pattern of steelmaking. Without belittling the good research results currently being obtained, it is fair to say that much more could be done to speed the development of new ideas.

The main weakness of the present research regime in the iron and steel industry is its unwillingness or inability to pass quickly from the laboratory to the pilot-plant stage. Yet how else can new processes be developed? It is the pilot-plant phase in development which usually calls for large expenditure, often at relatively short notice. Too often when projects reach the stage for pilot-plant study an interminable time is taken up in organizing the allocation of finance—or worse, the project has to be shelved. The finance required is often much more than one company can afford, while the end result often enough is of vital interest to several companies, if not to the industry as a whole. The provision by the industry of a substantial finance fund for pilot-plant installations would considerably improve matters.

Delay or failure to develop a research finding, of course, is not new; nor is it peculiar to the iron and steel industry—as evidenced by the frustrating experience of the inventor of the hovercraft. Knowing how costly such delays can be the iron and steel industry must surely take special action to avoid recurrences.

The case for a central pilot-plant fund calls for urgent examination. It should be treated as one of faith in the inventive talent of our country. It must not be delayed by questions of location and design of a pilot-plant station. Rather, as each idea crystallizes as a possible production process, money for pilot-plant work should be allocated quickly and the question of location should be determined subsequently by the nature of the raw materials required and other features of the project. In most cases location at a steelworks would be the best solution, and if, as time went on, a pilot plant became a characteristic appendage to a steelworks, then our attitude to progress would be a healthy one.

Stern Measures

WAY back in the "austerity" period that followed the last war a Government spokesman was reputed to have said that Whitehall was a better judge of what was good for the people than the people themselves, a remark which was greeted with the derision it might be expected to evoke. Where the whole economy of the country is concerned it must be conceded that the Government is in a better position to decide what steps to take to overcome an emergency than the men in the street that the BBC is so fond of chasing after with its television cameras.

The Cabinet has every channel of information, national and international, open to it; it is itself made up of able and knowledgeable men; it has the best brains in the Civil Service at its disposal; and it can call in for consultation leading economists and top industrialists. If, therefore, it decides that measures such as those announced by Mr. Selwyn Lloyd on Tuesday are essential in order to salvage the economy lesser men and women lacking such a full knowledge of the facts must accept the decision, which they will do with good or ill grace depending on the extent to which their own interests are immediately affected.

The coal and steel communities cannot flourish in a sick economy and are as anxiously concerned as anybody that national prosperity be maintained unimpaired, but they are bound to look at the Chancellor's proposals from the twin viewpoints of coal and steel and their likely effects on sales at

INTERNATIONAL CONFERENCE ON COAL SCIENCE

NEXT International Conference on Coal Science, the fifth of its kind, will be the first to take place in the United Kingdom. The conference, which meets every two years, is to be held at the Town Hall, Cheltenham (Glos), from May 28 to 30, 1963.

The first three conferences were held in Holland and the fourth in France last year.

The general secretary of the conference is:—Mr. R. G. J. Kingsmill, National Coal Board Coal Research Establishment, Stoke Orchard, near Cheltenham.

home and abroad. Mr. Lloyd's economic restraints, regarded as the toughest measures imposed since the austerity period of Sir Stafford Cripps, include a 7 per cent. Bank Rate, a curb on lending, a 10 per cent. surcharge on indirect taxation, and a brake on wages in the public sector. The Government's concern is with the sterling crisis arising from the overall payments position. It wants to increase productivity and expand exports, and has decided meantime to attempt a sizeable cut in home spending.

If the Chancellor's measures are effective, they are likely to reduce rather than expand home sales of coal and steel and products made from or by means of them, and just how they are going to help exports is not immediately discernible. As to their effect on productivity, that all depends on the success which attends Mr. Lloyd's plea for wage restraint. The increase in purchase tax and revenue duties may well have an inflationary effect, which would raise costs of production and make nonsense of export expansion plans.

The hope is that the Chancellor's stern measures will finally bring home to the public, in their dual role of producers and consumers, the serious situation which confronts the nation in the export field.

Minister to Open Fuel and Power Exhibition

MR. RICHARD WOOD, Minister of Power, is to open the Northern Exhibition of Fuel and Power for Industry, which will be held in Leeds (Yorks), from October 18 to 27. Sponsored by the Yorkshire Post, and the Steam Engineer, the exhibition will be the most comprehensive yet staged in the provinces devoted exclusively to fuel usage.

Among those associated with the exhibition will be the National Coal Board, the National Industrial Fuel Efficiency Service, the Combustion Engineering Association, the Central Electricity Generating Board, and the Gas Council.

Passing Thoughts . . .

ALTHOUGH output per man at the coal face shows an encouraging return on the capital invested in mechanization, productivity over the industry as a whole is sluggish. Apart from the coal face, productivity elsewhere underground is little better than it was 10 years ago. The Coal Board puts this down in part to the need to train new labour, but adds, "the rest is due to failure to deploy men efficiently." With a necessarily declining labour force, the industry cannot afford this drag on productivity. If a smaller, more compact, coal industry is to pay its way, its efficiency must increase steadily. —The Guardian.

If the demand for coal is to be lessened by the increasing use of oil it behoves us all to bring our minds to the problem of what can be done to produce oil from coal.—Mr. STANLEY BALDWIN, *the Prime Minister, reported in the Glasgow Herald of 25 years ago.*

Why, because they sing and dance their way through the streets of our ancient city should it be considered, as it were, unseemly conduct or classified as a "Teddy Boys' Picnic?" It is better that they do this, than march in jackboots and uniforms, dull products of a dull totalitarian state, nicely numbered in serried rank, obeying all orders, shouting when told, and acting like dehydrated robots, never going anywhere for they have no place to go. —Mr. SAM WATSON, secretary of the Durham NUM, defending the behaviour of the majority of the youngsters at the annual Durham Miners' Gala.

At a time when the coal industry is trying to bring a little sparkle back into its image a show of true generosity to those who have given their health in the quest for coal ought to be made.—Western Mail.

An industrial company is not just a machine for production; it is a community of human beings, and, as such, is subject to the stresses involved in any human relationship. Those stresses can become dangerous if people are regarded merely as extensions of the machines they control; depersonalized units to be transplanted from their homes for marginal economic benefits.—Mr. R. G. SOOTHILL, chairman of Turner & Newall, Limited, at the opening of the new Ferodo Works, Caernarvon.

There are many trained and experienced production engineers and technologists who through no fault of their own are available for engagements, but who, because they are mature and over 45 years of age, are precluded from adding their contribution to the national effort. . . . To discount experience, which has always been considered necessary as regards production, belies the many publicized statements that productivity is the main issue as regards the national economy.—Letter in the Daily Telegraph.

Although ironfounding has followed the common tendency since the war towards the concentration of production in the hands of fewer firms there is still considerable scope within the industry for relating output to altering and indeed alternating trends in national demand.—MR. KENNETH MARSHALL, director, the Joint Iron Council.

Fuel is probably the steel industry's biggest worry for the 1960s.—MICHAEL SHANKS, *writing in the Financial Times' annual review of British industry.*

Coal in 1980

PROSPECTS AGAINST THE CHALLENGE OF OIL

ALL indications are that in 1980 the demand for coal in Britain will be larger than now, says a new National Coal Board publication, Management News, in its first issue, which adds: "Oil will, of course, remain coal's most formidable competitor, but the coal industry's chance of a successful resistance to rapid further encroachment will be enhanced by the emergence of increasing difficulties on the side of oil itself."

While demand for coal will grow, there will still be plenty of oil, but not necessarily enough to meet all requirements. There may be a world-wide scramble for oil, possibly reflected in greatly increased oil prices. "Even if it may look from time to time as if less coal and more imported oil were cheaper or more convenient for certain users, or even for the economy as a whole, it is the longer-term prospect that should rule national fuel policy."

This longer-term prospect must be seen against such world-wide developments as population growth and industrialization. The indications are that by the 1980s we shall have a world population at least one third bigger than now and a level of world industrial production at least two and a half times as high as today, with fuel use more than doubled.

Board's Aims in 1961

This doubling would make it necessary to increase the consumption of oil fourfold, to double hydro-electricity, to maintain natural gas production at least at the present level, to obtain a substantial (though still modest) contribution from nuclear energy, and to get roughly 20 per cent. more coal.

In its assessment of the challenge from oil, the publication concludes that the oil industry will almost certainly not be able to continue rapid growth after the next 20 years. This, it says, would lead to a position in which there would be an intense struggle for oil supplies in countries like Britain.

In an article on progress in the coal industry, Management News points out that although generally speaking the board's 1961 aims were being achieved, there were some important exceptions. It mentions four: overall productivity, production of large coal, the increase in stores and repairs costs, and higher than expected earnings per manshift—in which performance was unsatisfactory. Output per manshift at the face had gone up so far this year by 3 cwt. compared with last year, but the overall increase was only ¼ cwt., about half the figure needed. Part of the difficulty is attributed to the increased recruitment of "green" labour, but the rest, it is suggested, was due to failure to deploy men efficiently.

"The board's mechanization programme is succeeding in its aim, but much of the benefit is being dissipated by wasteful use of manpower elsewhere in the pit. An unpalatable—but nevertheless true—fact is that our productivity elsewhere underground is little better than the 1951 level."

Turning to large coal production, the publication says that its proportion to total output so far this year has been about 23.1 per cent. and output was nearly 1,000,000 tons below the figure which would enable next winter's domestic demand to be faced confidently. The proportion would need to be increased to at least 24 per cent. over the whole of the country during the rest of 1961.

The National Coal Board, it is stated, has decided to extend open-cast mining in South Wales for anthracite and coking coal. "The Open-cast Executive is going ahead with the arrangements for obtaining the necessary approvals and for increased prospecting."

Management News has been introduced to keep senior staff better informed about the board's policy and the situation within the industry, and will be published five or six times a year. In an introductory article, Lord Robens, chairman of the NCB, points out the problem of internal communications and information in a large organization, a problem which the board had to master. "Management in the coal industry today is one of the most tough, challenging and exacting jobs in Britain. You have to implement the decisions taken by the board, so I want you to understand fully the reasons for those decisions and to carry you with us.

"This new publication will give you the facts that will enable you to speak up for coal when you get the chance and defend it against our uninformed critics."

NUM Opposes Plan to Close Welsh Colliery

PROPOSAL by the National Coal Board to shut down Felinfran Colliery, near Swansea (Glam), to boost the manpower of the new £4,500,000 Brynlliw Colliery, about 10 miles away, is being opposed by the South Wales Area executive of the National Union of Mineworkers. After Tuesday's meeting of the executive in Cardiff, the president, Mr. Will Whitehead, said, "We cannot accede to the board's request that the pit should be closed."

He went on: "Our impression is that there are plentiful reserves of coal at Felinfran, labour relations are excellent and we feel reasonably certain that within six or nine months the pit could be placed on a sound economic basis." The colliery, which employs 270 men, produces 1,000 tons a week.

FOURTEEN Bo'ness (West Lothian) families who recently received notice from the Scottish Divisional Coal Board to quit their homes in the East Castleloan area of the town by July 18, have received an extension of one month.

Appointments

New Managerial Post at Spencer Steelworks

STEEL production superintendent with the Steel Company of Wales, Limited, for the past five years, DR. A. J. KESTERTON has been appointed assistant general manager at the Spencer steelworks of Richard Thomas & Baldwins, Limited, now under construction at Llanwern, near Newport (Mon).

DR. A. J. KESTERTON

Dr. Kesterton, who was educated at Liverpool University, began his career in the steel industry as a management trainee with Dorman Long & Company, Limited, with whom he subsequently served as an assistant steel plant manager, and as steel plant manager at its Redcar works. From 1949 until 1955, he was manager of Scow's Abbey melting shop, and for the last five years has been superintendent in charge of that company's steel production in four steel plants, including the new V.L.N. steel plant, where steel is made in large steam oxygen blown converters.

Dr. Kesterton has been particularly interested in the use of oxygen in steelmaking practice, and was responsible for developing the roof mounted oxygen lances now used in open hearth furnaces throughout the world. He has written many technical papers, and in 1956 was awarded the Williams Prize of the Iron and Steel Institute. He has served on various British Iron and Steel Research Association technical committees, and has visited steelmaking plants in America, Italy, France, Belgium and Germany.

Mr. JOHN E. BAILEY has been appointed export manager to Advance Components, Limited, Hainault (Essex).

Mr. JOHN PULLEN, until recently on the editorial staff of Lloyds List & Shipping Gazette, has joined the staff of the shipbuilding industry's Information Office and will take up his duties there on August 1.

Mr. TIMOTHY H. KINDERSLEY has been appointed chief engineer of the engineering products division of Allis-Chalmers Great Britain, Limited. The position is a newly-created one in connection with the company's programme of expansion.

Mr. IAIN ASHCROFT has been appointed Scottish area manager for both the contractors' plant division and materials handling division of C. H. Johnson (Machinery), Limited, Stockport (Cheshire). He will also be responsible for technical sales representation of the mobile conveyor products of the materials handling division.

Appointed as assistants to Mr. J. L. Ritchie, group sales director of Holman Bros., Limited, Mr. RALPH JOHNS, sales office manager since 1942, will deal with Holman/Climax products and Mr. MALCOLM ABBOTT with the products of Goodyear Pumps, Limited. Mr. J. H. HOLMAN, assistant sales office manager, will succeed Mr. Johns as manager.

Consett Iron Company to Cut Output

PRODUCTION is to be restricted and 600 men are to receive notices of termination of employment at Consett Iron Company, Limited, Durham, next month. "As a result of the continuing deterioration in trade with a consequent decline in new orders," the company said on Tuesday, it "had very regretfully found it necessary to restrict output in most of its production departments as from August 14."

The statement says that No. 2 plate mill in the Consett works will close down as from July 28. "Output will be limited on the blast furnaces and the open hearth steel plant and the number of shifts worked per week on the rolling mill and ancillary service plants proportionately reduced. This programme, unfortunate, but inevitable, entails a run-down in the manning of these plants. Every effort is being made to find alternative employment for the maximum number of men thus displaced, but nevertheless notices of termination of employment will have to be given to some 600 employees."

Notices will only be given to workers who have not been very long with the company and to those who are over 65. The company's joint consultative council, which is representative of senior management and all trade unions having membership within the works, was assured that when trading conditions improved and production increased the first opportunity of re-employment would be offered to the men now displaced.

It is felt that the present difficulties might well be of a short rather than a long-term nature and the company intended to proceed with all its current development plans.

Stewarts and Lloyds' Oxygen Plans at Corby

OPERATION of existing tonnage oxygen facilities of Stewarts and Lloyds, Limited, at Corby (Northamptonshire) is to be handed over to the British Oxygen Company, Limited. In a joint statement on Wednesday, the two companies said that arrangements for the transfer were now being completed. The statement went on: "British Oxygen is progressively installing additional tonnage oxygen capacity and liquid oxygen storage facilities to meet the oxygen requirements arising from expanded steel-making operations."

The existing plant at Corby is capable of producing 200 tons of oxygen a day. The Corby works has an output of 1,100,000 tons a year. Under a £35,000,000 five-year development programme, this is to be expanded to 1,550,000 ingot tons by 1965.

METAL INDUSTRIES' PROFITS INCREASE

WITH a 9 per cent. final for the year to March 31, 1961, Metal Industries, Limited, is maintaining the total dividend at 15 per cent., as forecast, on capital increased by rights and acquisition issues. The group reports a larger trading profit of £2,339,656 (£1,722,715).

These figures include the profits of Lancashire Dynamo Holdings, Limited, for 15 months and of the Alcol (Australia) group for nine months against nil in each case for the 1959-60 accounts. After tax of £1,039,794 the net profit is £1,396,249 (£887,561).

ECSC Steel Record

HALF-YEAR PRODUCTION OF 37,000,000 TONS

NEW record crude steel output of 37,400,000 tons was achieved by the European Coal and Steel Community in the first half of this year, compared with 36,000,000 tons in the corresponding period of 1960, according to returns published by the ECSC headquarters in Luxemburg. Though France's figure is half that of Germany's and contributes only 25 per cent. to the total, the rate of increase at 6 per cent. is above Germany's 3½ per cent. and indicates that the 1961 goal set for it under the Government's plan, 18,500,000 tons, will be attained.

France will thus be able to claim to have doubled output in 10 years, each of which except one (1953) shared in the rise. The industry is not resting on its laurels, however, for the goal set for it under the new plan which comes into effect in six months is a capacity of 25,500,000 tons and possible maximum output of 24,900,000 tons.

The required investment is estimated at NF12,000,000,000, or about £850,000,000, according to the recently published annual report of the industry's federation, and will thus exceed the total of investments from 1945 to 1959, estimated at NF10,000,000,000.

Fiscal Reliefs Wanted

During that period heavy reliance was placed on public funds, and this reliance shrank to small proportions only in recent years owing to development of self-financing and loan issues under the joint guarantee of companies representing almost the entire industry. But to face its task in the next four years manufacturers argue that the Government must help by fiscal reliefs and/or by allowing an increase in steel prices if not releasing them from indirect control (on steel products).

The federation's report points out that its prices have not been allowed to rise for over a year and still remain lower than those of any other country in Europe. Since the Deutsche Mark revaluation the disparity is figured at 15 per cent. in favour of France. Mainly owing to the need for supplying home demand which absorbed 70 per cent. of production, the French industry in 1960 was able to increase exports to other Community countries by less than 3 per cent. while shrinkage of American buying reduced exports to extra-Community countries by 10 per cent.

On the other hand imports increased by 64 per cent. and the year's total of exports of steel, though leaving the industry at the head of all French exporting activities, was less than 1,000,000 tons more than imported steel products.

Other arguments employed by the industry are that the proportion of its indebtedness to turnover at 47 per cent. has reached a limit and is much heavier than that of its rivals who are able to finance far more of their investments from profits, and that the levy imposed on turnover by the High Authority, though lately lowered from 0.45 per cent. to 0.30 per cent., exceeds its legitimate requirements, unduly helping the process of reconversion in the coal mines, which is stated to absorb almost half the Community's resources.

Strike at Three Scunthorpe Steelworks

MAINTENANCE engineers at the three major steelworks at Scunthorpe stopped work on Monday in a dispute over two-shift working. The number of men involved is about 3,000. The works affected are the Appleby-Frodingham branch of the United Steel Companies, Limited, the Redbourne branch of Richard Thomas & Baldwins, Limited, and Lysaght's Scunthorpe Works, a member of the Guest Keen & Nettlefolds, Limited, group.

The men are all members of the Amalgamated Engineering Union and the dispute centres on 200 men at the Appleby-Frodingham works who object to working the two-shift system. The union gave notice six months ago to the management terminating the agreement and when it expired last weekend the men involved were instructed by the AEU to report for normal day work. The management refused to accept them on a day basis and the men went on strike. Members of the AEU at the other two works came out in sympathy.

In a statement, Appleby-Frodingham said it was quite unable to accept the right of the AEU to terminate the two-shift system "which has been standard practice for many years and is also operating in many other districts in the steel industry." The strike is not expected to have any great effect on production at the three works.

Nuneaton Tool Firm Asked to Expand in North

FOLLOWING the refusal of permission to extend its present factory at Nuneaton (Warwicks), and the recent announcement that in consequence it had decided to move to Giessen, in Germany, where there was a suitable site, Clarkson (Engineers), Limited, small tool manufacturers, has been invited by Mr. Rupert Spier, MP for Hexham, to consider establishing a factory at Prudhoe or Haltwhistle (Northumberland).

In his letter to Mr. F. H. Clarkson, chairman and managing director of the company, Mr. Spier said: "Several manufacturers from the Midlands have recently established factories in Northumberland and they have been delighted with the assistance which has been given to them by the Board of Trade and local authorities."

Steel Must Emphasise Exports—Minister

BRITAIN is moving into a period when the productive capacity of the iron and steel industry is likely to be sufficient for the demands on it, Mr. Richard Wood, Minister of Power, said at a meeting of the National Production Advisory Council on Industry last Friday. The emphasis from now on, he added, would be on efficiency and exports.

MR. RICHARD WOOD

During a discussion on the recent report on the iron and steel industry, Sir Hugh Beaver, vice-president of the Federation of British Industries and a director of Richard Thomas & Baldwins, Limited, said he thought it inevitable that at times the industry's capacity would not be fully employed. The demand fluctuated between 70 per cent. of capacity and the equivalent of 120 per cent.

Mr. Lewis Wright, of the TUC, said the industry might be taken as a pattern for others, and Lord Mills, Paymaster-General, complimented the industry on its very good labour relations, which he thought were largely the result of the work of the unions.

Mr. W. Paynter, general secretary of the National Union of Mineworkers, said that in the first half of the year 15,000 men left the coal mining industry, and about 60 per cent. of that wastage was of men under 30. The view was taken by the TUC that the drift from the pits was a symptom of lack of confidence in the industry, he said.

Mr. Wood said that he, too, was concerned about the drift from mining, and so was the National Coal Board. There were two ways of trying to restore confidence. One was to give protection to the industry and provide guaranteed targets, and the other, advanced by Lord Robens, chairman of the NCB, was to improve the industry by mechanization and higher productivity.

His own view was that the only way to restore confidence was by more mechanization. The drift from the mines was most pronounced in areas with a labour shortage, he said.

Mr. Reginald Maudling, President of the Board of Trade, commented that the reports on regional productivity seemed to underline a mystery. Unemployment was falling—most regions in fact faced a shortage of labour—and yet there was little increase in production.

BILL compelling the big American copper companies in Chile to increase their output by a minimum of 15 per cent. every three years is to be submitted to Congress by the Chilean Government. The 15 per cent. accumulative increase would be based on average output during the previous five years. The Bill also urges that the largest possible amount of copper ore mined in Chile should be refined there.

Personal

Rotherham Forge Director Retires at 90

ONE of Yorkshire's oldest industrialists, who has completed oved 50 years as a director of Rotherham Forge & Rolling Mills Company, Limited, Mr. ERNEST PARKIN retired on Wednesday at the age of 90. The son of a colliery owner, he graduated in engineering at Victoria University, Leeds, in 1890, and from 1893 to 1910 was manager and agent for the Greasborough Coal Company, one of his father's collieries, in Rotherham. When the colliery was worked out in 1910 he joined the board of Rotherham Forge.

Mr. Parkin was appointed managing director of the company in 1912, chairman in 1923 and held the office until 1959. He is a founder member and was president of the Midlands Forge Masters' Association from 1934 to 1945. Mr. Parkin is a Freeman of the Cutler's Company. His son, Mr. Henry J. Parkin, has been a director of the firm since 1938.

General manager finance and treasurer of the Broken Hill Proprietary Company, Limited, Mr. R. G. NEWTON is retiring on September 30. He has been associated with the company at Newcastle and Melbourne for over 43 years.

Chairman of the Sheffield Smelting Company, Limited, Mr. R. JARDINE, unveiled a plaque on Wednesday on new buildings which the firm is erecting near its Attercliffe works. The development is expected to be finished next spring.

South-western divisional Area regional officer of the Colliery Officials and Staffs section of the National Union of Mineworkers, Mr. TOM MANTLE has been elected national president of the organization. Mr. Mantle, who has been regional officer for the past 12 years, has been national vice-president since 1957.

New president of the Federation of British Rubber and Allied Manufacturers is Mr. C. H. M. BAKER, a director of the Firestone Tyre & Rubber Company, Limited. Vice-presidents for 1961-62 are Mr. D. E. CAMERON, chairman and managing director of the B. B. Chemical Company, Limited, and Mr. D. D. MARSHALL, managing director of the Greengate & Irwell Rubber Company, Limited, and chairman of the British Rubber and Plastics Belting Manufacturers' Association.

RISE IN UK ENGINE EXPORTS

BRITISH manufacturers of internal combustion engines achieved a 22.6 per cent. increase in exports outside the Commonwealth in the first quarter of the year compared with the corresponding period of 1960. All sections of the industry registered increases with the exception of a slight dip in shipments of spares to the Commonwealth.

Exports to foreign countries continue to increase faster than to the Commonwealth with the result that the quarter's figures totalled £6,000,000 against just under £5,000,000 last year, while exports to the Commonwealth rose to £4,700,000 from £4,000,000.

IN THE SECOND quarter of this year net income of the United Steel Corporation was equal to 98 cents per share ($1.38), making earnings in the first half year equal to $1.45 ($3.35) per share.

In Parliament

"COAL IMPORTS FOLLY"

Minister Seeking Welsh Supplies for SCOW

MR. RICHARD WOOD, Minister of Power, answering MR. GERALD NABARRO (Con.), said that he had been having general conversations with the chairman of the National Coal Board regarding the supply of appropriate Welsh coking coals to the Steel Company of Wales, Limited, at prices competitive with the United States Virginian coals offered, in order to obviate the issue of an import licence. The President of the Board of Trade hoped to make an announcement about the application by the Steel Company of Wales, Limited, before the summer recess, he added.

MR. NABARRO commented: "Having regard to our grave balance of payments difficulty and other similar troubles, it would be incalculable folly to bring in American coal when, with a little intelligent manipulation, on commercial standards, of the present price structure of the NCB, adequate coking coal could be available from opencast and deep pits in South Wales to meet the somewhat diminished demand of the Steel Company of Wales."

MR. WOOD said that the President had this aspect of the matter very much in mind.

MR. J. GRIFFITHS (Lab.) urged the Minister to bear in mind that if by any chance the Government gave permission to the application, it would have a serious effect upon the views which the miners took about the future of the industry in South Wales, and aggravate an already serious manpower position

[A warning was given by Mr. Will Whitehead, the South Wales miners' president, on Tuesday, that the miners would oppose any cut-price supplies of coal to the steel industry to offset the difference between British and American prices. "Let them pay the proper economic price," he said. "If the Government want to subsidize the steel industry let them do it openly and not at the expense of the struggling coal industry We will oppose any plan to give them preference."]

Summer Coal Stocking

ASKED by MR. T. H. H. SKEET (Con.) whether he was satisfied with the steps being taken to encourage the public to stock solid fuel this summer, MR. RICHARD WOOD, Minister of Power, said that both the National Coal Board and other producers of domestic fuels had announced special price reductions for the summer period in order to encourage stocking. "It is most important that merchants and consumers should take full advantage of these reductions and stock as much fuel as they can."

MR. J. C. GEORGE, Parliamentary Secretary to the Minister of Power, said that on July 8, merchants' and producers' stocks included 1,800,000 tons of house coal, over 8,000,000 tons of coke, anthracite and boiler fuel, and 200,000 tons of other manufactured fuels.

LURGI GASIFICATION PLANTS

CONSIDERATION would be given to the setting up of further Lurgi gasification plants if the Lurgi process turned out to be fully competitive, MR. RICHARD WOOD, Minister of Power, told MR. ROBERT WOOF (Lab.). He could not however raise hopes about Lurgi plants being built in Durham, because, as he understood, the qualities of Durham coal were not thought most likely to be very suitable for the Lurgi process.

Asked by MR. T. H. H. SKEET (Con.) if, before giving consent to Lurgi projects, he would consider importing methane, and the cracking of petroleum feed stocks imported into the UK which would produce gas at an economic price, MR. WOOD said he was considering together broadly the methane proposals, the use of petroleum feed stocks, and the Lurgi process.

MANPOWER IN SCOTS PITS

MANPOWER situation in coal mines in Scotland was causing him less anxiety than it was in other parts of the country, MR. RICHARD WOOD, Minister of Power, told MR. EMRYS HUGHES (Lab.). Mr. Hughes had asked about the extent of the manpower shortage and the recruitment of young workers.

MR. WOOD said: "Individual pits may occasionally be short, particularly of skilled craftsmen. In the first 22 weeks of the year the NCB recruited 1,055 juveniles, compared with 878 in the same period last year.

THE Parliamentary Secretary to the Ministry of Labour told Mr. Stephen Swingler (Lab.), that as local labour was not available, the Ministry was now prepared to consider an application from Newcast Foundries, Limited, Newcastle-under-Lyme, to employ suitably qualified foreign workers.

REPLYING to a suggestion by Mr. Emrys Hughes (Lab.), that the National Coal Board should offer a bonus payment to encourage miners to stay in the mines, similar to that which it was proposed to be paid to soldiers to retain them in the Army, the Minister of Power said conditions in the industry were best dealt with by negotiation.

Growing Challenge of ECSC Steel

EMPHASIZING the need for developing industry in the UK and for higher industrial production, Mr. C. H. T. Williams, chairman of Park Gate Iron & Steel Company, Limited, and Master Cutler, said last Friday that while Britain's steel production in the last five years had increased at an average rate of 4 per cent. per year, the advance in the European Coal and Steel Community was at the rate of 8 per cent.

MR. C. H. T. WILLIAMS

The growing strength of the ECSC in competition with Britain was seen in the fact that steel price increases in Britain had been at the rate of 4 per cent. per year, but within the ECSC the increase rate was 1 per cent. Mr. Williams said that of the £1,000,000,000 spent by industry on capital development in 1960, the steel industry spent £172,000,000. This meant that the new plant was of larger sizes, sometimes involving groupings of smaller plant and requiring more space and often different locations.

Mr. Williams, who was speaking at a luncheon at Wakefield (Yorks). for civic leaders in the Riding, said that in this industrial expansion, local government was called upon for services to meet the changing pattern of population and its needs, and should endeavour to think in "the new and larger context."

Aveling-Barford Acquires Hoveringham Engineering

ROAD machinery and earth moving equipment manufacturers, Aveling-Barford, Limited, Grantham (Lincs), has purchased Hoveringham Engineering Company, Limited, from Hoveringham Gravels, Limited, for about £300,000. Hoveringham Engineering, manufacturers of structural steelwork, colliery surface plant, conveyor systems and mechanical handling equpiment, will continue to operate under its own name within the Aveling-Barford group.

Disposal of the Engineering Company will, it is stated, enable Hoveringham Gravels to concentrate entirely on its sand and gravel interests. It will also, as part of the contract and subject to satisfactory price arrangements, obtain all its gravel plants for the next 10 years from the Aveling-Barford group.

AT ITS COWLEY (Oxford) factory, the new training centre which the Pressed Steel Company, Limited, has built and equipped at a cost of more than £250,000, will be opened by the president of the Amalgamated Engineering Union, Mr. W. J. Carron, on September 20. Eventually the centre will have an intake of about 100 apprentices a year.

£1,000,000 Wire Plant Extension by GKN

TWO-ACRE extension, costing £1,000,000, of United Non-Ferrous Metals, Limited, a Guest Keen & Nettlefolds, Limited, subsidiary, which is the largest producer of brass wire in the UK, was officially opened by the Lord Mayor of Birmingham, Mr. E. E. Mole, on Thursday of last week. It will almost double the company's output of wire, rod and strip.

A feature of the new plant is a 2,500-ton capacity Loewy horizontal hydraulic extrusion press, backed by six of the company's mains frequency induction billet heaters, which is capable of dealing with one 1,500-lb. billet every minute. The dies in the machine regulate the diameter of the drawn bar to 1,000th of an inch, and it is polished before ejection.

The development also includes a 25,000 sq. ft. casting shop containing modern electric induction furnaces and gas-fired continuous casting furnaces, a rod mill, and extensive metal stores and despatch area.

Hawker Siddeley Merges Diesel Engine Interests

MERGING of its two heavy diesel engine manufacturing subsidiaries, Mirrlees Bickerton & Day, Limited, and the National Gas & Oil Engine Company, Limited, into one organization, is announced by Hawker Siddeley Industries, Limited. Both companies' factories are located in the Manchester area. The merger, which will take the form of a complete integration of interests, will enable the Hawker Siddeley group "to compete more effectively in the industrial and marine markets of the world."

Chairman of the new company, which has not yet been named, will be Sir George Briggs, joint managing director of Hawker Sideley Industries and chairman of both Mirrlees and National Gas. Mr. C. F. Barnard, executive vice-chairman of both companies, will be vice-chairman and managing director of the new organization.

Sharp Fall in Engineering Orders

LARGELY due to the fact that both the March and April estimates were inflated by big orders for power stations, provisional figures issued on Tuesday by the Board of Trade indicate a sharp fall in the volume of new orders placed with the mechanical and electrical engineering industries during May. The board's index dropped from an estimated 143 in April to 117 in May. All the decline in ordering has been at home, while the volume of new orders from oversea rose.

Production during May appears to have been running some 2 per cent. higher than a year earlier and the board says that while production of capital goods has been growing steadily, there has also been an upward trend in output of some electrical consumer goods.

OPENING OF a factory in Australia to make stainless steel strip is being considered by the Atlas Steel Company, Limited, of Canada. It may use Australian steel billets, or, if these are unavailable, import them from Canada. Executives have discussed the project with the French Government.

African Notes

USCO EXPANSION PLANS

Record Output of Steel Products in 1960

LONG-TERM plans to increase the capacity of steel melting and rolling units in various departments to meet future demand are being considered by the board of the Union Steel Corporation (of South Africa), Limited (USCO), Mr. K. Rood, chairman, announced. Output of all products in 1960 was a record, reaching 168,850 tons, worth £12,000,000, compared with 146,200 tons (£10,300,000) in 1959. The output of steel products from the Vaal and Klip works rose by 15 per cent. to 145,332 tons, establishing a new tonnage record.

The tonnage of higher-priced special purpose qualities and shapes despatched increased by 32 per cent. to 75,700 tons, while despatches of mining drill steel reached a new peak of 10,400 tons.

The new 16 in. mill at USCO's Vaal Works was recently completed, replacing a mill which has been in operation for 40 years. With modifications, it can be made to double its capacity during the next five years by means of a secondary heating furnace, a second roughing stand and an additional cooling bank.

Fall in Domestic Demand

During the past month there have been further signs of a fall in domestic demand for rolled steel products in South Africa. Most flat products, including hot and cold rolled sheets, and galvanized sheets, have been in free supply, but the demand for plates remained strong. While sections and bars continued to be distributed on an allocation basis, demand for light sections eased. Window sections, reinforcing rounds up to $\frac{5}{16}$ in. dia., and wire rod were freely available. Demand for Iscor wire continued in excess of production capacity.

Iscor has advised consumers of its intention to export any production surplus to domestic demand, and has invited customers to advise the Corporation of its requirements. It is now apparent that Iscor will have to seek oversea markets for hot rolled sheets, hot rolled steel strip, hard unannealed coiled sheet, galvanized corrugated and flat sheets, and coils and wire rod. Exports of pig-iron surplus to home requirements continue. Latest available import figures indicate a decreasing trend.

The increasing demand for special steels has led a leading Austrian manufacturer, Bohler Brothers, of Vienna, to set up a supply company in Johannesburg. The growth of South African industry has made it more than ever necessary to have stocks of such steels on call. About 10 per cent. only of special steel requirements is produced locally, and imports include high speed steels for cutting tools, carbon and alloy tool steels, stainless and spring steels and steels for use in atomic projects.

The British Government has agreed in principle to the building of a 200-mile railway line in Swaziland to carry iron ore out of the territory. The £8,000,000 railway will start at the ore deposits at Bomvu Ridge, just over the eastern Transvaal border, and will run through the centre of Swaziland to join a link line built by the Portuguese administration to truck ore for shipment at Lourenço Marques. The ore will be taken by a group of Japanese steel companies, who will buy up to 1,200,000 tons a year for 10 years starting in 1964. The contract is a valuable one for the Anglo-American Corporation, which has the rights to mine Bomvu Ridge. Five countries are to take part in the mining and railway proposition.

In a statement on the prospects of an iron and steel industry in Nigeria, the Federal Ministry of Commerce and Industry states that the country possesses the raw materials—coal, iron ore and limestone—necessary for its development. A compendium of various studies on the prospects of setting up a steel industry has been prepared for the Federal Government by P.E. Management Group (Nigeria), Limited. The first detailed evaluation of the market in West Africa for all types of iron and steel products has also been prepared by a member of the P.E. Management group of companies, and a detailed survey of the availability and types of ferrous scrap throughout Nigeria has been made.

The South African railways has announced that a contract has been placed for the installation of a fully mechanized ore-handling plant at Port Elizabeth. The contractors hope to start building by the end of this year, and to have the plant ready for operation by the middle of 1963.

Final returns of railway coal traffic in South Africa during the year ended March 31, 1961, show that 24,315,222 tons were moved by rail from Transvaal and Free State mines—over 2,500,000 tons more than in 1959-60. From the Natal mines, the total was 6,015,145 tons, a rise of 735,740 tons. Manganese traffic went up by 387,000 tons to nearly 878,000 tons, and iron ore by 243,000 tons to 507,000 tons.

The coal industry in South Africa would be able to meet any future demands made on it, said Mr. Coulter at a recent meeting of the Chamber of Mines. Coal was "the country's only worthwhile indigenous source of energy," he said, and was likely to remain so for many years. Since 1910, when the demand was about 6,500,000 tons, to 1960, when 42,000,000 tons was produced, the industry had met its responsibilities by continually expanding production to meet the the country's demands.

Further order for South African coal has been received from Burma. The order is for 300,000 tons of bituminous coal to be delivered by Natal mines during 1961. A similar contract was concluded in 1960. The South African railways has also been asked to arrange to take 75,000 tons of coal to the ports for export to Ceylon, and 50,000 tons for East Pakistan—to be supplied by the Transvaal mines.

Orders Placed

Dalglish Plant Order From Russia

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CONTRACT HAS been awarded to British Insulated Callender's Cables, Limited, by the Central Electricity Generating Board for the supply and installation of some 13¼ miles of 132 kV power cable at Cardiff. The contract, worth £238,000, is the largest of its kind ever placed by the CEGB in the South Wales division. The installation will be carried out by British Insulated Callender's Construction Company, Limited.

CONTRACT HAS been placed by Peter Dixon & Son, Limited, with W. H. Allen Sons & Company, Limited, Bedford, for a 6,450-kW back-pressure turbo-alternator set, to be installed in the power station of its West Marsh paper mills, Grimsby. A 3,000-kW Allen turbo-alternator is already installed at the Grimsby paper mills. The Hulett Group, South Africa, has placed an order with W. H. Allen for a condensing turbo-alternator which will provide power for one of its sugar factories in Rhodesia.

New President and Officers of SIMA

AT the annual meeting last week of the Scientific Instrument Manufacturers' Association of Great Britain, Mr. A. W. Jones (Fleming Radio (Developments), Limited) was installed as president for the year 1961-62 by Mr. G. C. Ottway (W. Ottway & Company, Limited), the retiring president, who now becomes a vice-president of the association. The other honorary officers of the association elected were: Mr. R. E. Burnett (Marconi Instruments, Limited), vice-president and president-elect; Mr. G. C. Ottway (W. Ottway & Company, Limited), vice-president; Major Wm. Logan (Avo, Limited), hon. secretary; and Mr. G. S. Sturrock (Kelvin & Hughes, Limited), hon. treasurer.

Newly elected members of the council were: Mr. J. E. C. Bailey (Baird & Tatlock, London, Limited); Mr. A. G. Peacock (Mervyn Instruments, Limited); Mr. L. B. Lambert (Negretti & Zambra, Limited); Mr. J. E. T. Haile (Rank Precision Industries, Limited); Mr. I. C. M. Worsfold (W. H. Sanders Electronics, Limited); Mr. H. Wyn Griffith (Shirley Developments Limited); and Mr. A. Richardson (Stanhope-Seta, Limited).

Factors leading to successful tunnelling are effort, efficiency, and economy. The author describes the organization and preparation required to drive both level and dipping tunnels at high speeds. An account is given of the factors leading to record-breaking drivages at Bank Hall Colliery, where the Rise tunnel was driven 66 yd. in a five-day week in March, 1959, and the Towneley tunnel was advanced 107 yd. in a seven-day week in December, 1959. The paper was presented to the Lancashire Branch of the National Association of Colliery Managers on January 25, 1961.

High-speed Tunnelling in Lancashire

RECORD DRIVAGE AT BANK HALL COLLIERY

*by M. Danecki**

BURNLEY AREA, in the North-Western Division of the National Coal Board, is small but profitable, producing 1,250,000 tons of saleable coal per annum from 12 pits, seven of them being drift mines. Coal has been worked in the Area as far back as the 14th century. The King, Dandy, Arley, and Mountain seams have been worked extensively up to recent years. The Lower Mountain (Union) Seam is still mined at Bank Hall and Hapton Valley at a depth of over 500 yd.

A major reconstruction scheme has been carried out at Bank Hall and at Hapton Valley reconstruction work is in progress. Both these schemes have entailed a considerable amount of tunnelling and it is this work which is described in this paper.

BANK HALL COLLIERY

Bank Hall Colliery is situated on the northern perimeter of Burnley and is one of the largest pits in the Area. It originates from 1860 when the first shafts were sunk. Through the years the pit has undergone a number of changes and a major reconstruction scheme was carried out soon after vesting day, when horizon mining and locomotive transport were introduced.

A new pit bottom was constructed about 100 ft. above the old winding level and tunnelling operations on a large scale were carried out in the Towneley and Rise districts. In 1955 remarkable progress was achieved in the drivage of the Towneley tunnel. An average of 32.5 yd. per week was maintained over a period of six months with a maximum advance of 40 yd. in one week. In 1957, after the completion of the first stage of Towneley tunnel (1,300 yd. long) the Rise district was developed on similar lines.

As the Rise workings had advanced over 2,000 yd. from the nearest loading point served by the locomotive haulage, the situation regarding ventilation and coal transport on numerous belts became very difficult. It was, therefore, decided to make a new, large size road, through the old, closed in goaf between the Rise intake and return airways. This would bring the locomotive haulage to the spot where the new faces were planned and would provide more air, using the new tunnel as a main intake road and the other two old roads as return airways.

The strata, consisting of shale and 2-ft. hard fireclay in the floor, were dipping almost at the same rate as the drift for the first 700 yd. Eventually the fireclay replaced the shale and filled all the face. As this was not a capital project the tunnel drivage had to be carried out on the pit's revenue.

Two-piece, 14-ft., splayed to 15-ft. by 10-ft. 6-in. high arches and Pyrolith-treated, fire-resisting boards were chosen to support the tunnel. The two-piece arches, however, were replaced by 16 ft. 9 in. by 11 ft., three-piece arches in order to increase the size of the road and also to enable the arches to be transported through the shaft on flat-bottom trolleys, thus reducing the manual handling of steel.

The drivage of Rise tunnel was carried out on the afternoon and nightshifts only, so as not to interfere with coal production. The disposal of

* Tunnelling engineer, West Lancashire Area, North-Western Divisional Coal Board.

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FOR THE NEW wire drawing department of Henry Wigg'n & Company, Limited, Hereford, Braithwaite & Company Structural, Limited, a subsidiary of Braithwaite & Company Engineers, Limited, is supplying 1,000 tons of structural steelwork. The company is also supplying a pressed steel tank for the rod mill which Henry Wiggin & Company is also building at Hereford.

CONTRACT WORTH £250,000 for a steam-raising plant has been placed with John Thompson (Wolverhampton), Limited. It is to be built for the Industrial Estates Management Corporation for Wales and will be processed by a multiple installation of large oil-fired shell-type boilers. Steam will be supplied from a centralized source to 34 factories on the Treforest Industrial Estate, near Pontypridd, South Wales.

CONTRACT HAS been awarded to British Insulated Callender's Cables, Limited, by the Central Electricity Generating Board for the supply and installation of some 13½ miles of 132 kV power cable at Cardiff. The contract, worth £238,000, is the largest of its kind ever placed by the CEGB in the South Wales division. The installation will be carried out by British Insulated Callender's Construction Company, Limited.

CONTRACT HAS been placed by Peter Dixon & Son, Limited, with W. H. Allen Sons & Company, Limited, Bedford, for a 6,450-kW back-pressure turbo-alternator set, to be installed in the power station of its West Marsh paper mills, Grimsby. A 3,000-kW Allen turbo-alternator is already installed at the Grimsby paper mills. The Hulett Group, South Africa, has placed an order with W. H. Allen for a condensing turbo-alternator which will provide power for one of its sugar factories in Rhodesia.

New President and Officers of SIMA

AT the annual meeting last week of the Scientific Instrument Manufacturers' Association of Great Britain, Mr. A. W. Jones (Fleming Radio (Developments), Limited) was installed as president for the year 1961-62 by Mr. G. C. Ottway (W. Ottway & Company, Limited), the retiring president, who now becomes a vice-president of the association. The other honorary officers of the association elected were: Mr. R. E. Burnett (Marconi Instruments, Limited), vice-president and president-elect; Mr. G. C. Ottway (W. Ottway & Company, Limited), vice-president; Major Wm. Logan (Avo, Limited), hon. secretary; and Mr. G. S. Sturrock (Kelvin & Hughes, Limited), hon. treasurer.

Newly elected members of the council were: Mr. J. E. C. Bailey (Baird & Tatlock, London, Limited); Mr. A. G. Peacock (Mervyn Instruments, Limited); Mr. L. B. Lambert (Negretti & Zambra, Limited); Mr. J. E. T. Haile (Rank Precision Industries, Limited); Mr. I. C. M. Worsfold (W. H. Sanders Electronics, Limited); Mr. H. Wyn Griffith (Shirley Developments Limited); and Mr. A. Richardson (Stanhope-Seta, Limited).

Factors leading to successful tunnelling are effort, efficiency, and economy. The author describes the organization and preparation required to drive both level and dipping tunnels at high speeds. An account is given of the factors leading to record-breaking drivages at Bank Hall Colliery, where the Rise tunnel was driven 66 yd. in a five-day week in March, 1959, and the Towneley tunnel was advanced 107 yd. in a seven-day week in December, 1959. The paper was presented to the Lancashire Branch of the National Association of Colliery Managers on January 25, 1961.

High-speed Tunnelling in Lancashire

RECORD DRIVAGE AT BANK HALL COLLIERY

*by M. Danecki**

BURNLEY AREA, in the North-Western Division of the National Coal Board, is small but profitable, producing 1,250,000 tons of saleable coal per annum from 12 pits, seven of them being drift mines. Coal has been worked in the Area as far back as the 14th century. The King, Dandy, Arley, and Mountain seams have been worked extensively up to recent years. The Lower Mountain (Union) Seam is still mined at Bank Hall and Hapton Valley at a depth of over 500 yd.

A major reconstruction scheme has been carried out at Bank Hall and at Hapton Valley reconstruction work is in progress. Both these schemes have entailed a considerable amount of tunnelling and it is this work which is described in this paper.

BANK HALL COLLIERY

Bank Hall Colliery is situated on the northern perimeter of Burnley and is one of the largest pits in the Area. It originates from 1860 when the first shafts were sunk. Through the years the pit has undergone a number of changes and a major reconstruction scheme was carried out soon after vesting day, when horizon mining and locomotive transport were introduced.

A new pit bottom was constructed about 100 ft. above the old winding level and tunnelling operations on a large scale were carried out in the Towneley and Rise districts. In 1955 remarkable progress was achieved in the drivage of the Towneley tunnel. An average of 32.5 yd. per week was maintained over a period of six months with a maximum advance of 40 yd. in one week. In 1957, after the completion of the first stage of Towneley tunnel (1,300 yd. long) the Rise district was developed on similar lines.

As the Rise workings had advanced over 2,000 yd. from the nearest loading point served by the locomotive haulage, the situation regarding ventilation and coal transport on numerous belts became very difficult. It was, therefore, decided to make a new, large size road, through the old, closed in goaf between the Rise intake and return airways. This would bring the locomotive haulage to the spot where the new faces were planned and would provide more air, using the new tunnel as a main intake road and the other two old roads as return airways.

The strata, consisting of shale and 2-ft. hard fireclay in the floor, were dipping almost at the same rate as the drift for the first 700 yd. Eventually the fireclay replaced the shale and filled all the face. As this was not a capital project the tunnel drivage had to be carried out on the pit's revenue.

Two-piece, 14-ft., splayed to 15-ft. by 10-ft. 6-in. high arches and Pyrolith-treated, fire-resisting boards were chosen to support the tunnel. The two-piece arches, however, were replaced by 16 ft. 9 in. by 11 ft., three-piece arches in order to increase the size of the road and also to enable the arches to be transported through the shaft on flat-bottom trolleys, thus reducing the manual handling of steel.

The drivage of Rise tunnel was carried out on the afternoon and nightshifts only, so as not to interfere with coal production. The disposal of

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dirt was fitted in to the colliery haulage system using 4½-ton mine cars and 65-h.p. battery locomotives on 50-lb., 3-ft. 6-in. gauge track. At the tunnel face a 12-ton, 70-h.p. Distington loader, type 50B, was introduced to match the large-capacity mine cars and to accomplish the required yardage at low cost.

Preparation, Drivage, and Results

The initial steps in any tunnelling operations must be very cautious and closely watched. Erratic procedure and any bad practices must be stamped out with determination and without delay in order to avoid making a precedence of bad working manners, which are so difficult to rectify once they are established.

Three weeks to three months may elapse before manpower, supervision, equipment. supplies, etc., are dovetailed into an efficient working machine.

Obviously, most of the thinking, consulting, and making decisions must be done before the commencement of a project, but even with the best knowledge and experience in the matter, each scheme has its own particular problems which will have to be solved as they arise. The standard patterns cannot be blindly applied everywhere, and although there is undoubted value in the trained memory, it is the well-trained mind which is able to weigh up situations and facts on the spot to form correct judgment and make the job a success.

It is of paramount importance that before any labour contract price is contemplated the tunnelling operations are brought to a very high standard of efficiency. The workmen must trust the management and have confidence that they can earn high wages without overtime, making the tunnelling operations an economical proposition by using, not only their hands, but also intelligence, dexterity, and mechanical aptitude.

The tunnelling project is doomed to failure if the folly of making an allowance in money to overcome shortcomings in organization and supervision is introduced. The labour contract price in a well-organized level tunnel driven in shales and supported with 16-ft. 9-in. by 11-ft. arches set at 3-ft. centres should not exceed £8 per yd., excluding bonus and other payments. The price for a similar type drift dipping 1 in 4, should not exceed £12 per yd.

In the Rise tunnel, while the No. 1 junction, which had been upset by a major fall, was being recovered, the 12-ton Distington loader was brought in parts down the pit and assembled. The other equipment, such as drilling machines, hoses, fan, ventilating tubes, etc., were also prepared for drifting operations.

After 10 yd. of drivage, another V-shaped junction 80 ft. long, 33 ft. wide at the base, and up to 15 ft. high, was made within six weeks with one shift of six tunnellers. After the completion of the junctions, the normal drivage of 14-ft. to 15-ft. by 10-ft. 6-in. tunnel was resumed on afternoon and night shifts consisting of three and four tunnellers, respectively.

The maintenance work, extension of track, pipes, and air tubes was done during the dayshift by four men and one mechanic under the supervision of a deputy. The experienced tunnellers, who had worked on the scheme for some weeks, were paid a special rate of 60s. per shift and the newly started men, whether trained or not, were paid 45s. per shift, this rate being increased to 60s. per shift after a six weeks' trial period, provided they met the requirements of the management.

The arrangements regarding organization, manpower, and equipment seemed to be very healthy, and good results were expected from the commencement of the drivage. Consequently, the facemen were offered a contract price of £9 per yd. of supported and fully covered tunnel. Although the men were reluctant at first to accept such a low price, they soon realized that they could average 20 yd. per week, and that there was a great possibility of earning high wages if they wished to do so. This was exactly what the management were aiming for: "High wages at low production cost."

The loader driver was also the leader of the team and he was paid 5s. per shift more than the tunnellers out of contract money, this man's earnings being up to £5 15s. per shift. The auxiliary labour was on standard rates, far below those enjoyed by the facemen, and as there was no scope for an incentive bonus to be paid by the pit, a special scheme was introduced with the consent of the facemen by which a bonus from 10s. to £1 per week was paid to track men, mechanics, and locomotive drivers out of the face contract money.

As the drivage of Rise tunnel progressed some further improvements regarding time and labour saving were introduced. In consequence, the labour contract price at the face was revised to £8 per yd. in January, 1958, after 280 yd. of drivage. This price remained even when the size of the tunnel increased to 16 ft. 9 in. by 11 ft. five weeks later.

The facemen continued to enjoy high wages and the auxiliary labour its bonus, and there were numerous volunteers who wanted to be trained as tunnellers and, eventually, to work in the Rise tunnel. The management took advantage of the circumstances and the popularity of the tunnelling work to train more tunnellers and increase the face teams up to

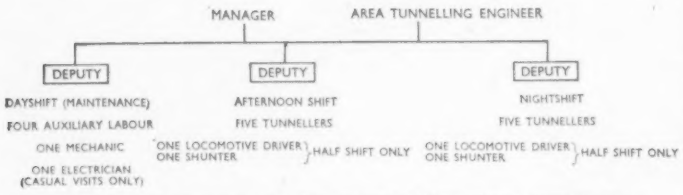


FIG. 1.—MANPOWER AND SUPERVISION OVER THREE SHIFTS FOR THE RISE TUNNEL DRIVAGE.

five men per shift in order to accomplish the weekly yardage of 30 and over on two shifts only.

The Rise tunnel provided ideal training for new tunnellers. The well-disciplined and prosperous facemen were a good influence on the young and eager newcomer who was attached to the team for a six weeks' training period. At the start each trainee was paid the same wage as he would have received in the other parts of the pit before coming to the tunnelling work. Half of his wages were covered by the pit and the other half came out of the face contract money. Proficient learners soon had their earnings increased and eventually they became fully trained and fully paid tunnellers.

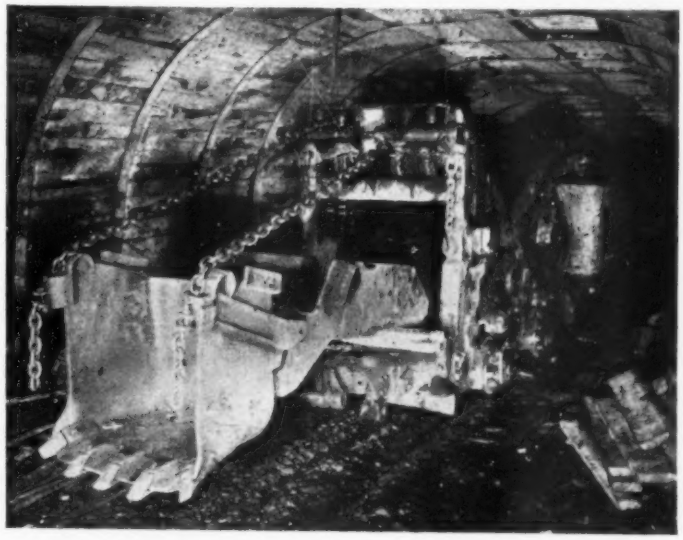


FIG. 2.—THE DISTINGTON LOADER USED IN THE RISE AND TOWNELEY TUNNELS AT BANK HALL COLLIERY.

Organization

The manpower and supervision over three shifts was as shown in Fig. 1.

The equipment used in the tunnel comprised:—One Distington tunneller type 50B, 12-ton, 70-h.p. loader (Fig. 2); five Holman Silver 3 drilling machines, with 8-ft. and 10-ft. $\frac{7}{8}$-in. Padley & Venables tapered drills; three second-hand Holman Silver 3s were kept in readiness as stand-by machines. Transport was provided by an English Electric 65-h.p. battery locomotive hauling 4½-ton (coal) mine cars. The tunnel was ventilated by a 10-h.p. two-stage Woods of Colchester fan and 24-in. dia. steel air tubes. Three D.6 Monopumps were installed for pumping water from permanent sumps and an Atlas Copco L.P.C. 21 submersible pump driven by a compressed-air turbine was used for clearing water at the tunnel face. Other services included a 10-in. dia. compressed-air range and a 3-in. dia. water range.

The supply of materials from the surface to the face was carried out almost entirely by mechanical devices. The arches, lagging boards, and other materials were loaded at the stores compound at the surface by cranes or forklift trucks into 4½-ton mine cars or onto flat-bottom trolleys and transported to the tunnel face without any further handling by auxiliary labour. There the supplies were unloaded by the dayshift men or the facemen on the other two tunnelling shifts.

The tunnellers carried in the explosives for their own shift (one or two rounds of shots) in canisters made of old conveyor belt. The men, in most cases, were riding in and out in the mine cars, a distance of about 1½ miles between No. 4 shaft and the tunnel face.

As can be seen from Fig. 1 the dayshift, consisting of day-wage men on rates ranging from 21s. to 39s. a shift carried out the necessary maintenance and preparations for the drivage of the tunnel on the remaining two shifts. One mechanic was attached to the Rise tunnel, his job was to inspect, grease, and make running repairs to the loader and the drilling machines each day. Small adjustments and maintenance of the equipment not requiring skill, were performed on the spot by the facemen in order to minimize stoppages and save the mechanic's working time. Most repairs to the equipment were done in the tunnel in close proximity to the face. A bench fitted with a vice and shelves containing spares was moved forward as the drivage of the tunnel progressed.

Four men of the auxiliary labour teams, supervised by a deputy extended the permanent track, 24-in dia. air tubes, compressed-air and water pipes on the dayshift and made all the other preparations in readiness for further drivage.

The single 3-ft. 6-in. gauge permanent track was made of 50-lb., 10-yd. rails laid on 6-ft. long wooden sleepers at 2-ft. 9-in. centres. At the tunnel face, however, prefabricated track of 50-lb., 6-ft. rails mounted on two steel sleepers made of corrugated roof bars was used for the Distington loader. Both the prefabricated and permanent tracks were laid at a distance not less than 3 ft. from the solid face of the tunnel, otherwise the occurrence of blowing it up during firing of the round was highly possible.

Operations of the Tunnelling Cycle

Holman Silver 3s, well-known and reliable drilling machines mounted on airlegs, were in use in

Rise tunnel throughout the drivage. The Burn cut method of drilling the face, shown in Fig. 3, appeared to be most suitable in the strata the tunnel was to be driven through and it was used from the beginning. As all holes are drilled parallel or thereabout, this cut enabled five to six drilling machines to be operated at one time.

The compressed air required for drilling the face was supplied in 10-in. dia. pipes from the surface compressors serving the pit. All water ranges were of 3-in. dia. Carlton pipes. Throughout the drivage the irregularities in alignment of pipe ranges were negotiated with standard bends and straight pipes and not with special pipes made to a template. Four surface compressors rated at 2,500 cu. ft./min. of free air at 80 lb./sq. in. were driven by 550-h.p. synchronous induction motors.

After extensive trials with various types of drill rods and bits it was decided that, having taken into account the cost and suitability for a wide variation in the hardness of rocks, Padley & Venables 8-ft. and 10-ft. tapered rods and 1⅝-in. P.M. and 1½-in. tungsten carbide tipped bits were used.

Table 1 shows the cost of drill rods and bits used in the Rise tunnel compared with other pits in 1958.

TABLE 1.—*Comparison of the Cost of Drill Rods and Bits in the Bank Hall Rise Tunnel with Costs at Other Pits.*

Colliery.	Cost per lineal yd.	Cost per cu. yd.	Cost per ft. drilled.
	£ s. d.	s. d.	d.
Ashton Moss	1 17 5	1 10.6	2.5
Bickershaw	16 3	7.8	1.3
Bank Hall Rise tunnel ..	12 6	7	1.2

The drilling time of an 8-ft. shothole in medium hard shales using 1⅝-in. P.M. bits was between 3 and 4 min. Although the estimated life of a P.M. bit was only one drilling (about 100 ft.), in most instances the P.M. bit drilled twice that footage.

In sandstones and other hard strata where no convergence of shotholes is expected, 1½-in. tungsten carbide tipped bits, fitting the same rod as the P.M. bit, were used and the drilling time of an 8-ft. hole was 6 to 9 min. The average life of a drill rod was 600 to 800 ft. of shothole drilled. The top holes on the face were drilled from the floor and scaffolding was not used on any occasion.

Stemming and Shotfiring

At the end of drilling operations and while one or two machines were still in action, a blowpipe, ½-in. dia. and 9 ft. in length, was assembled and all the shotholes were cleaned out by compressed air in readiness for charging and stemming. Millisecond delay-action detonators and Polar Ajax (C), 1¼-in. by 8 oz. low freezing explosive was used to break the solid face. The distribution of explosives is given in Table 2.

Dry sand in fire-resisting paper bags, called "stembags," prepared on the surface were found to be the most suitable, safe and effective stemming.

TABLE 2.—*Distribution of Explosives for Blasting a 16-ft. 9-in by 11-ft. Tunnel, Using the Burn Cut.*

Shots.	No. of det.		Explosive per hole.	Number of holes.	Explosive.
	Millisec delay.	½ sec. delay.			
			oz.		lb.
Sumpers	0	0	40	4	10
	6	1	40	4	10
	8	2	36	4	9
Easers ..	10	3	28	5	8¾
	11	4	28	9	15¾
Trimmers	11	4	28	4	7
	12	5	36	10	22½
	13	6	44	2	5½
			Total ..	42	88½

Four to five 8-in. sand packets per shothole were adequate to make a good seal against the expanding gases during shotfiring. Water stemming in 12-in. and 36-in. plastic bags also was tried, but discontinued as less safe and of greater cost than the sand packets. Occasionally, plastic bags had a fine perforation, which caused the stemming to collapse in the shothole and blow out. Water stemming, as such, could not be used safely and efficiently without introducing some other solid type of stemming in order to make a plug at the aperture of the shothole. The use of two types of stemming was against the trends of standardization in tunnelling work and it was abandoned as unsuitable.

On completion of charging the face, the joints between two detonator leads were covered with red p.v.c. insulating sleeves and those between the cable and the detonator lead with aluminium tube filled with petroleum jelly and enclosed in a white p.v.c. sheath. As a rule, the shotfiring cable leads were coupled to the detonator leads nearest the central hole of the sump. This is done to ensure that the sump shots are fired in case of a short circuit caused by damage to the insulation of the leads during stemming.

In water-bearing and abrasive strata, alkathene covered detonator leads are in common use. In order to make shotfiring in the tunnel safer a 100-shot, 4-millisecond cut-off Schaffler exploder was obtained to replace the 1,500-V., 100-shot Beethoven exploder in use.

The tunnel ventilation system consisted of a two-stage, 10-h.p. Woods of Colchester fan and 24-in. dia. steel tubes producing 6,000 cu. ft. of air/min. Canvas extensions at the end of the tubes were not used. The rigid duct was kept close to the face and the full capacity of the tubes provided an adequate flow of air. The extension of the ventilating tubes thus was greatly simplified and the amount of unnecessary work considerably reduced.

The difficulty of negotiating curves with the rigid tubes was overcome by 3-ft. long pieces with the slant joint rated at 1 in 4 in the middle. The slant joint of the special tube was fitted with standard circular flanges into which the oval edges of the tubes were forced and welded. By rotating the slant flanges of the special tube a deflection angle

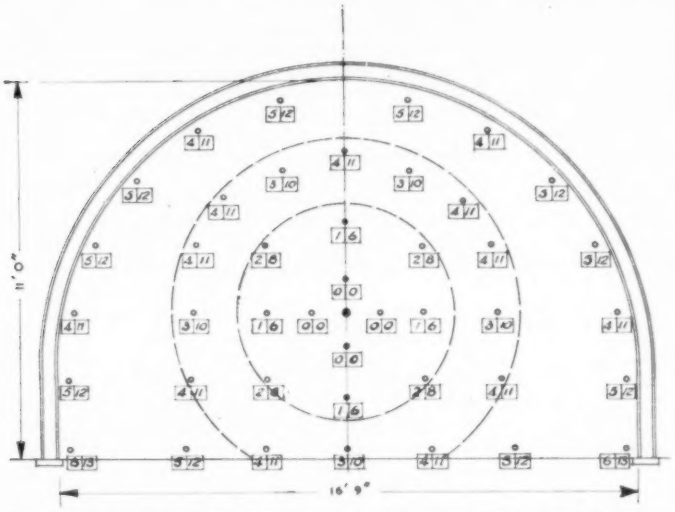


FIG. 3.—DISTRIBUTION OF SHOTHOLES AND DELAY-ACTION DETONATORS IN A 16-FT. 9-IN. BY 11-FT. TUNNEL. THE RIGHT-HAND NUMBERS REFER TO SHORT-DELAY DETONATORS AND THE LEFT-HAND NUMBERS TO HALF-SECOND DELAY DETONATORS.

of duct, from straight to 28 deg. was obtained. Several special tubes like these can negotiate even difficult curves in a tunnel, giving an uninterrupted flow of air, and, what is very important, they can be re-used again in other parts of the pit.

Firedamp was non-existent in Rise tunnel, but statutory tests for methane content in the mine air were thoroughly carried out.

In readiness to combat eventual gas layering, extensive trials with inclined sheets were made with some success. The 2 ft. 6 in. wide sheets were suspended across the tunnel at intervals of 30 yd. and 18 in. from the roof between the two adjacent arches set at 3-ft. centres. It was observed during the trials that the fumes after shotfiring were deflected to the roof. This behaviour of the fumes became even more vigorous and turbulent in the roof when the locomotive was shunting up and down the tunnel. Interesting trials were also carried out in reversing the ventilation in order to minimize the dust and fumes in the mine air.

Forced ventilation was applied and in about 10 min. after shotfiring, the fumes reached the shotfiring station. The exhausting ventilation applied in the tunnel produced only 62 per cent. capacity of the forced ventilation and the face, even half an hour after shotfiring was not suitable for work. Even the final trials of combined ventilation, *e.g.*, forced ventilation for 2 min. after shotfiring, to drive the fumes past the end of the air tubes and then exhausting ventilation, did not produce any positive results. A small fan producing forced ventilation in conjunction with the main exhausting fan will solve some ventilating problems. The advantages, however, would be heavily outweighed by the disadvantages of using two ventilating systems.

Within 10 min. after firing a full round the men resumed work at the face. The loader operator started filling the dirt almost immediately. His assistant's job was to couple and uncouple the cars at the loader, he also held the electric flexible cable supplying the power to the loader. The third man sprayed the muckpile to keep the dust down. The remaining two men went to the face to dress the roof and sides of loose rock, advance the horseheads, and secure the roof. Afterwards, the men having reached the muckpile at a convenient height, they completed packing behind the last two arches and covered the gaps against the archplates with corrugated iron sheets on both sides. These two men on completion of their duties at the face, retired outbye to prepare the five drilling machines and hoses for the next drilling operation.

By this time about half the round had been filled and the face was ready for the extension of the prefabricated track. The excavation in front of the existing track was fairly deep, so permanent wooden sleepers were laid at 2-ft. 9-in. centres with very little spade work, and the prefabricated track laid on top. This method helped greatly to stabilize the temporary track and eliminated almost completely the pick and spade work when laying the permanent track.

Powerful and Efficient

The 12-ton 70 h.p. Distington tunneller, type 50B, is a powerful and very efficient loader. Its performance is good in both soft and hard rocks on a level floor. It consists of 13½-cu. ft. capacity bucket and boom attached to the main body with large pin. This arrangement enables the bucket to swing sideways and in vertical plane.

Gathered dirt slides off the elevated bucket and boom at about 45 deg. on to the five-ply ⅞-in. thick belt fitted between the side plates of the loader. At its delivery end a tensioning device keeps the belt tight and prevents stalling when wet. The double leverage of the bucket and the boom as one unit is a great advantage in "rooting out" the bulky and heavy dirt, and the machine does not back out to lift the load. The bucket has another great advantage in that it can easily break large, unmanageable stones when dropped from the raised position, thus relieving the facemen for other duties. The traction and hoist units are both driven from one point by 70-h.p. a.c. remote controlled motor, through a gearbox, chain transmission, planetary

mechanisms, and friction clutches. The forward and reverse movement of the loader is actuated by two foot pedals and all the bucket movements by two handles.

The connection between the bucket and hoist unit drives is made with chains. The loader was fitted with a heavy-duty draw bar with automatic couplings (Fig. 4). It was specially designed at

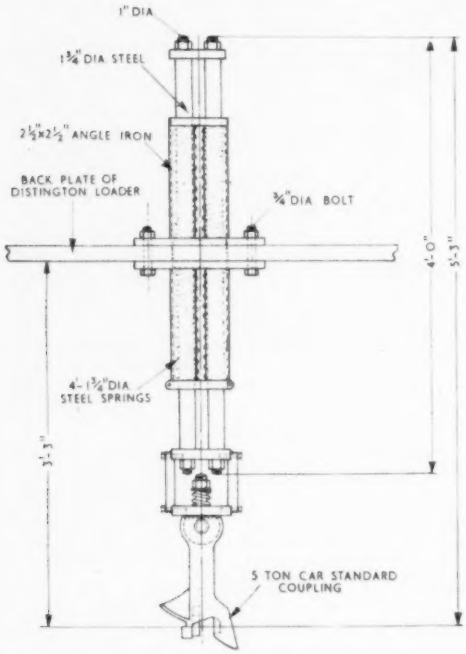


FIG. 4.—PLAN OF HEAVY-DUTY DRAWBAR AND COUPLING FITTED TO THE DISTINGTON 50B LOADER.

Bank Hall for the Distington tunneller to overcome the problem of excessive shocks caused by loads attached to the back of the loader. When driving the curved tunnels the delivery end of the loader was provided with a detachable deflection plate mounted on the belt to prevent the spillage of dirt.

The loader can easily be derailed especially when an unskilled driver is operating it. This, however, was not frequent in the Rise tunnel, the loader being mounted on a 3-ft. 6-in. gauge track. Re-railing of the loader usually took from 2 to 5 min. and was carried out by running it into a special prop set at an angle. This method is perfectly safe and is practised with the majority of loaders. The loader gave trouble-free service for about 12 months.

The first breakdowns were caused by wear of the tooth sprockets, sprocket chains, hoist chains, and clutch bands. These were not difficult to detect and remedy. The planetary mechanisms on Distington tunnellers have to be carefully inspected and maintained.

During filling operation the 4½-ton car was filled in 1½ to 2 min. and the total time required for filling and shunting was 3 to 5 min. depending on proximity of the shunt. The shunting of cars was performed by the English Electric 65-h.p. battery locomotive. Before shotfiring, one empty car was attached to the loader in readiness for filling and 11 cars were coupled to the locomotive. When the car was filled the locomotive, with the empty cars attached, picked up the full car and shunted it to the nearest rail crossing, and brought the next empty car in.

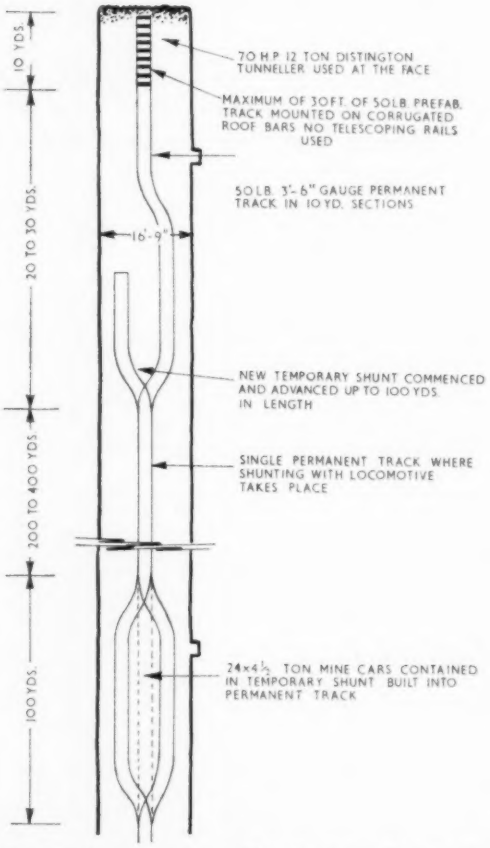

10 YDS.
20 TO 30 YDS.
200 TO 400 YDS.
100 YDS.
70 H.P. 12 TON DISTINGTON TUNNELLER USED AT THE FACE
MAXIMUM OF 30FT. OF 50LB. PREFAB. TRACK MOUNTED ON CORRUGATED ROOF BARS. NO TELESCOPING RAILS USED
50LB. 3'-6" GAUGE PERMANENT TRACK IN 10 YD. SECTIONS
16'-9"
NEW TEMPORARY SHUNT COMMENCED AND ADVANCED UP TO 100 YDS. IN LENGTH
SINGLE PERMANENT TRACK WHERE SHUNTING WITH LOCOMOTIVE TAKES PLACE
24x4½ TON MINE CARS CONTAINED IN TEMPORARY SHUNT BUILT INTO PERMANENT TRACK

FIG. 5.—ARRANGEMENT OF TRACKS AT THE FACE OF THE RISE TUNNEL.

The arrangement of tracks at the face is shown in Fig. 5.

When half the round was filled and while the facemen were extending the loader track, the locomotive shunted 12 full cars out and brought 12 empty cars in to complete the round. The filling

of dirt from a full round of 8-ft. pull (2½ yd. advance) was completed in 1½ to 2 hr. In order to reduce the locomotive shunting journeys and the loader waiting time during shunting a switch for large mine cars was designed and tried in 1958 with some success. At the present time the car switch is undergoing modification.

Three-piece 16-ft. 9-in. by 11-ft. steel arches of 5-in. by 4½-in. section, and Pyrolith-treated, fire-resisting, 2-in. thick cover boards were used as the main supports for the Rise tunnel. In most cases the excavation for the arches was made in such a manner that there was no need for the extensive use of pneumatic picks.

Using the loader as a working platform the arches were set on wooden foot blocks at 3-ft. and 4-ft. intervals, and 60 to 70 boards per arch were used for lagging. The gaps in the lining, opposite the archplates were covered with corrugated iron sheets overlapping about 5 in. on each arch. The sheets rested on the packs behind the arches or against the tight sides. The packing of sides and shoulders was in most cases completed after the next round was fired. The cavity between the arches and the exposed roof was filled with chocks resting on two adjacent arches.

The facemen were provided with ratchet keys which were very handy and speedy in bolting the fishplates. In some instances, when setting the arches, the facemen put the crown on to the horse-heads immediately after shotfiring and bolted on the legs after the dirt was filled out. It was more usual, however, to fill the full round of dirt first and then set the arches by bolting one leg and the crown together on top of the loader. This section was lifted on to one of the horseheads and the second leg bolted to the loose end of the crown. Every newly set arch was secured in position by three Sylvesters and chains.

The centre and gradient lines were extended frequently and painted. The shadow method of alignment was used, sighting from the face through the nearest sighting string and the deputy's flame safety lamp some distance outbye. The setting of the arches to the gradient line was done with the help of a long string stretched along the painted gradient line 3 ft. above the floor level. At intervals of 100 yd. refuge holes were made by the face-men for which they were paid an extra £3. The manhole arches 6 ft. by 3 ft. by 3½ in. by 3½ in. were made of scrap steel in the Area Central Workshops.

In the Rise tunnel and the drift described later Pyrolith-treated boards were used in preference to concrete slabs. According to the tests referred to in the divisional strata control engineer's report dated March 22, 1957, boards of equivalent size to concrete slabs have greater resistance to breaking stresses. The initial cost is lower by about £1 10s., they do not suffer from breakage and loss before use, and are easier to handle, both in transit and erection.

Concrete slabs, however, fit better between the arch webs; being of greater weight they give more stability to the arches and from the ventilation point of view make better and smoother surface to the road lining. The advantages of covering boards, regarding cost (saving from £4 to £5), quality, and faster drivage far outweigh those of the concrete slabs, and because of this Pyrolith covering boards have become very popular and are widely used in the North-Western Division.

The covering boards used in the Rise tunnel were well packed behind and were whitewashed soon after erection.

In the roads on both sides of the tunnel a disturbing volume of water was gathering and penetrating into the Rise tunnel. This difficulty was overcome by sinking sumps 9 ft. deep by 2 ft. 6 in. square (inside dimensions), at intervals of about

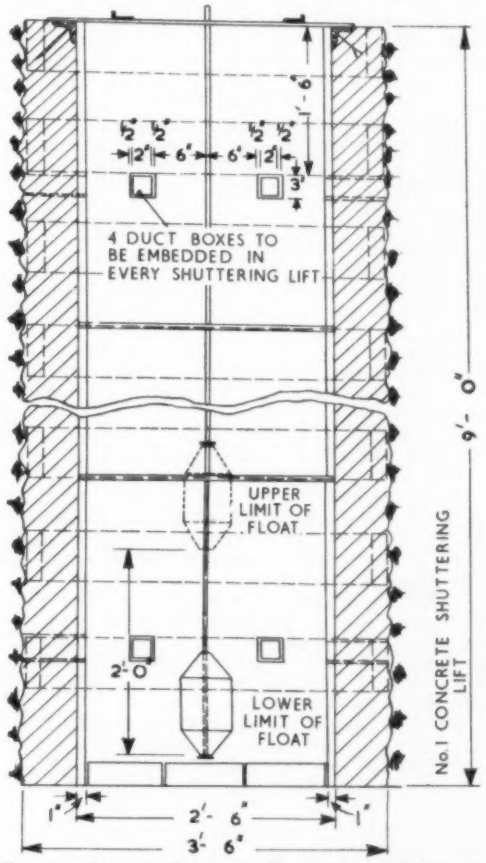


FIG. 6.—SECTION THROUGH ONE OF THE SUMPS TO COLLECT THE WATER IN THE RISE DRIFT.

400 yd. in the tunnel floor (Fig. 6). The sump walls were made of concrete or bricks, the latter being preferred.

Monopumps, type D.6, driven by electric motors dealt with the influx of water. The pump motors

TABLE 3.—*Typical Weekly Yardage Driven and Manpower used in the Rise Tunnel when Operating Two Working Shifts per Day.*

Week ended.	Yards driven.	Shifts worked.	Face m/s.	Other m/s.	Supervision m/s.	Total m/s.	Dirt filled, cu. yd. per Face m/s.	Dirt filled, cu. yd. per All employed m/s.	Cost per yd.	Remarks.
									£ s. d.	
31.5.58	22⅛	9	37	35	10	82	13·00	5·85		
7.6.58	25½	10	42	39	11	92	12·97	5·92		
14.6.58	31	10	47·5	35	10	92·5	14·03	7·21		
21.6.58	29½	10	49	25	12·5	86·5	12·87	7·29		
28.6.58	28½	10	47·5	37	12·5	97	12·90	6·32		
Total	136⅛	49	223	171	56	450				
Average	27·37						13·15	6·53	50 16 6	

were actuated by remote controlled float switches, type WOIF. The switch floats were so adjusted that the water table was kept about 7 ft. below the tunnel floor. This system of dewatering the road proved to be very effective, and from the time it was introduced the tunnel remained completely dry.

Record Drivage

The good tunnelling results, shown in Table 3, accomplished during the 18 months of drivage in 1957 and 1958 in the Rise tunnel (on two shifts only) passed almost unnoticed. The yardstick of good drifting seemed to be rather the number of yards driven in one week. It was therefore decided to test the tunnelling abilities of the men, organization, and equipment working at full pressure and on three shifts, and the record drivage of 66 yd. in a five-day week was achieved in March, 1959.

During the time of the record drivage the size of the excavation was 20 ft. 6 in. wide and 12 ft. 6 in. high, the 14-ft. to 15-ft. arches being widened by 4-ft. extension pieces and set at 4-ft. centres on 1-ft. foot blocks. The strata consisted of 9 ft. of sandy shales, 10 in. inferior coal, 1 ft. 6 in. of ganistered fireclay, and 1 ft. 2 in. of hard sandstone.

The face labour contract price was £8 per yd. for the 20-ft. 6-in. by 12-ft. 6-in. tunnel, the total labour cost per yd. being £14 19s. 9d. and the total material cost £34 6s. 8d. per yd.

During the dayshift of 8 hr. the complete manpower consisted of six tunnellers, including the chargehand operating the loader, five men for handling supplies and general labour, one locomotive driver, one shunter, one mechanic, and one deputy-shotfirer.

The afternoon and night shifts consisted of six tunnellers, three men handling supplies and general labour, one locomotive driver, one shunter, one mechanic, one deputy-shotfirer, and one overman.

The times of the operations, based on 12 complete rounds, advancing 2.64 yd. per round are given in Table 4.

Major Fall of Roof

Before the Rise tunnel drivage commenced a major fall, reaching 45 ft. in height at a four-way junction had to be cleared and supported. In such instances, before any work is resumed the cavity above the roof must be well ventilated in order to prevent a local firedamp explosion which may be caused by a rock falling on rusty steel. This rule was strictly observed before and during the recovery work at the junction. The repair work was carried out in three stages, as indicated in Fig. 7.

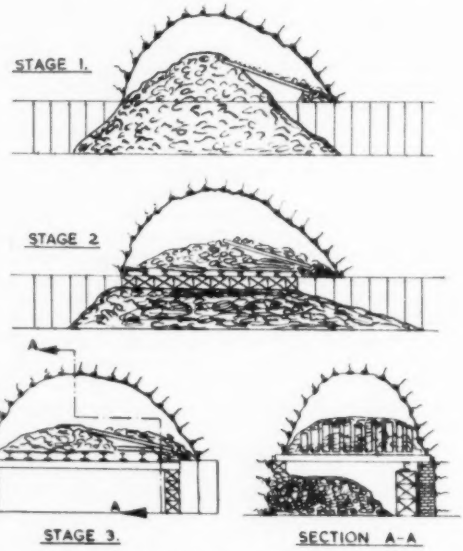


FIG. 7.—SECTION ALONG THE CENTRE LINE OF THE RISE DRIFT SHOWING THE STAGES IN THE CLEARANCE OF THE MAJOR FALL.

Stage 1—Provision of protecting apron against falling rock above working place. The apron was made of 9-in. by 3-in. thick planks of a suitable length which rested at an angle of 15 deg. to 30 deg. on the last permanent support and the muckpile.

Stage 2—Using the muckpile as a working platform, the permanent supports, consisting of 20-ft. long by 12-in. by 8-in. steel joists were set at 3-ft. intervals on concrete slabs. The distance between the levelled dirt and the newly supported roof was 3 to 4 ft., giving adequate room for safe working and for jacking the roof girders into position. Although the dirt in the fall was badly broken, there was a great deal of interlocking between the large slabs of shales. It was intended to retain as much dirt above the girders

TABLE 4.—*Times of the Operations in the Rise Tunnel, Based on 12 Complete Rounds.*

Part of the cycle.	Average time taken.	Best time taken.	Remarks.
Drilling ..	min. 59.4	min. 30	Average 39 holes drilled with 8-ft. drills—sump; 10-ft. drills—easer and trimmers.
Charging and firing	38.5	27.5	Including clearing fumes and snap time.
Filling ..	75.8	58.5	Average 250 tons of dirt filled and wound up the pit every shift.
Setting two arches	62	50	Every 1 hr. 49 min. advanced one yard throughout the week = 4.4 yd. per shift.
Laying temporary and permanent track	20.3	—	This time can be cut by employing extra labour to lay the permanent track while the face men are drilling and charging the face.
Stoppages and breakdowns	23.5	—	Fall of roof, waiting for cars, electrical faults, chain breaking, derailment of loco. and cars, influx of water.
Total ..	279.5 = 4 hr. 39½ min. advancing 2.64 yd.		

as possible to form a cushion against the further falls. The excavation for the next girder was made by removing a strip of dirt starting at one end of the girder and supporting the roof with 5-ft. boards. One end of the boards was rested on the last girder and the other on a prop at a 4-ft. interval from that girder providing ample room for the next permanent support to be set 3 to 4 in. higher than required. If any of the girders dropped below the roof line a 60-ton hydraulic jack was used to put it back in position.

Stage 3—When all the girders were in position and the roof was completely supported a 34-ft. compound beam was introduced to span the roof supports at one end. The compound girder was supported with chocks of concrete slabs resting on a solid floor outside the muckpile. Having secured the roof the next step was to fill out the loose dirt, making the excavation for the brickwork and support the steel joists permanently. The procedure was repeated on the opposite side of the road, using the same compound girder as a horsehead, until the junction was completed.

Towneley Tunnel

Towneley tunnel, rising 1 in 200, was driven in solid strata, 1,500 ft. below ground and about 5,000 ft. from the shaft. The first 1,300 yd. was driven in 1955 and the main loading point was made at the far end to serve a double-unit face, advancing in the same direction. At the present time the Towneley District with its double-unit and rise and dip faces is the main coal producing district at Bank Hall Colliery. The double-unit had now advanced some distance from the existing loading point and constantly extending roads in the Union Seam required ever increasing maintenance and it was decided to extend the Towneley tunnel and move the main loading point inbye and cut out the excessive backwork.

In the second half of 1959 the manpower and tunnelling equipment were transferred from the Rise to the Towneley tunnel. Drifting operations were commenced and carried out in the same manner as in the Rise tunnel.

Eventually a record advance of 107⅛ yd. in a seven-day week was achieved in the Towneley tunnel in December 1959. The size of the excavation was 18 ft. wide by 12 ft. high, giving an area of excavation of 21.5 sq. yd. The strata consisted of shales, sandstone beds, and cannel in faulted ground. The tunnel was supported by 16-ft. 9-in. by 11-ft. arches and was fully lagged with Pyrolith-treated fire-resistant boards.

Costs and Manpower

The contract price for the face labour was £8 13s. 3d. per yd., the total labour cost per yd. was £25 19s. 3d., including overtime, and the total material cost was £43 2s. 5d. per yd. The tunnelling crews worked four 6-hr. shifts with six men, one deputy, and one shotfirer per shift. Other manpower associated with the tunnel drivage worked 8-hr. shifts, four track and supplies men, one mechanic, one electrician, one locomotive driver, and one shunter, working on a three-shift-per-day basis, and three pipe men on a two-shift-per-day basis. The total manpower was 62 men.

The equipment used was the same as that for the Rise drift except that 12 Holman Silver 3 drilling machines were used, six of which were standby machines.

The times of operations, based on 16 complete rounds, advancing 2.61 yd. per week are given in Table 5.

TABLE 5.—*Times of Operations in the Towneley Tunnel, Based on 16 Complete Rounds, Advancing 2.61 yd. per Round.*

Part of the cycle.	Average time taken.	Best time taken.	Remarks.
Drilling ..	min. 47.4	min. 34	Average 39 holes drilled with 10-ft. drills.
Charging and firing	46.2	25	Including clearing fumes and snap time.
Filling ..	110.8	65	Average 82.5 cu. yd. of dirt filled and wound up the pit every shift.
Setting two arches	38	20	Every 1 hr. 34 min. advanced 1 yd. or 3.83 yd. per six-hr. shift.
Stoppages and breakdowns	3	—	Waiting for cars, electrical faults chain breaking, derailment of loco. and cars.
Total ..	245.4 min. = 4 hr. 5.4 min. advancing 2.61 yd.		

SAFETY ASPECTS OF HIGH-SPEED TUNNELLING

Despite the stringency of the Act and Regulations, there is sometimes a flagrant disregard of the statutory requirements in mines. Even now more than one fatal accident still occurs every day. The introduction of mechanization, inexperience, the adventurous spirit of taking chances and forgetfulness take a major toll. The tunnel sites, regarding the size and shape are like motorways in

comparison with the tangled roads in the vast areas of working and, generally, they are not accident prone. The higher speeds and efficiency in transport and working methods are the obvious outcome of progress in mining and these factors should be encouraged within safe limits.

Accident Free Drivage

There was not one reportable accident during the high-speed drivages at Bank Hall Colliery. All possible safety precautions were taken, and the author is sure that it pays in the end to comply with the spirit of intention in the Act; it is far better to learn how to behave from it than from accidents and misfortunes. Untidy and half-hearted workmanship undoubtedly reflects the untidy state of mind of the supervisors and workmen. It gives great satisfaction to see experienced and disciplined craftsmen in the tunnel going about their jobs with confidence and in the right manner. The saving of time in the tunnelling operations resulting in higher yardage was due to the following factors:—

(1) A high standard of organization and supervision.
(2) Experienced and disciplined manpower adequate in strength and number.
(3) High wages at low cost of production.
(4) Large capacity equipment to deal with dirt disposal.
(5) Full utilization of the face in 24 hr.
(6) High standard of maintenance.
(7) Keen interest of the management in the tunnelling and development work.

Regarding the safety of men in the high-speed drivages the following points were strictly observed:—

(1) Duty of the officials in charge to impose the requirements of the Act.
(2) Use of the experienced labour in adequate strength.
(3) Elimination of excessive fatigue of workmen by working four 6-hr. shifts in 24 hr.
(4) Appointment of a deputy in charge of the 6-hr. shift and a shotfirer to carry out all the statutory and other duties.
(5) Frequent and thorough inspections and maintenance of the equipment in use.
(6) Special care taken in maintenance of the shot-firing equipment and cables.
(7) Use of millisecond delay-action detonators.
(8) Application of the insulating sleeves on detonator leads at the face.
(9) Trials to prevent gas layering.
(10) Maintenance of adequate clearances between the sides and the equipment in the tunnel.
(11) Securing the compressed-air appliances.
(12) High standard of workmanship.

SURFACE DRIFT AT HAPTON VALLEY

Hapton Valley Colliery is situated approximately two and a half miles west of Burnley adjacent to the Burnley to Accrington road. It is currently producing an average of 550 tons of saleable coal per day from the Union Seam at an o.m.s. of over 30 cwt. and making a profit of 6s. to 7s. per ton.

The Union Seam, about 500 yd. below the surface has a gas emission of approximately 1,600 cu. ft. per ton of coal produced and, even with methane drainage a difficult ventilation problem exists. In order to improve the ventilation and simplify coal transport and supply routes at the colliery the following two proposals were considered:—

(1) The drivage of a drift from the surface 1,260 yd. to the Union Seam, which would be the main intake airway, thus allowing the two existing airways to be duplicate returns. The estimated cost of this proposal was £110,629.

(2) The enlargement of the present airways from the pit bottom to the outbye end of the main development panel, a total of 2,950 yd. at a cost of £100,000.

The former proposal was considered to be a better and more economical arrangement in the long term and finally the scheme for the drivage was approved by the North-Western Divisional Board on January 12, 1960. The purchase of land, preparations, and other formalities took about two months, and it was not until the beginning of April, 1960, that the tunnelling operations commenced.

Preparatory Stage, Drivage, and Results

The initial excavation for the entrance to the drift on the surface was made with a dragline and

FIG. 8.—TRACK-MOUNTED EIMCO 622 LOADING IN THE HAPTON VALLEY DRIFT.

bulldozer. When the limit of dragline operations was reached one shift of four tunnellers and a 50-h.p. caterpillar-mounted traxcavator were put on the job to start tunnelling. In the second week two-shift working was introduced and in the fourth week three shifts of four men worked in the drift and advanced 9, 13½, and 19 yd. per five-day week, respectively.

After four weeks of drifting, two Eimco 21 loaders anchored on ropes, were installed at the face of the drift. The dirt was filled out into 27-cu. ft. capacity, side-tipping cars and wound up to the surface with an old 62-h.p. winder. On the surface a diesel locomotive shunted three cars at a time to a nearby quarry where the dirt was tipped. The arduous conditions, namely constant water at the face and hard sandstones in the path of the drift, proved too much for this equipment. Consequently, the two Eimco 21 loaders were replaced by one track-mounted Eimco 622 (Fig. 8), a more powerful machine. As a result the weekly advance increased to over 16 yd. In the opinion of the

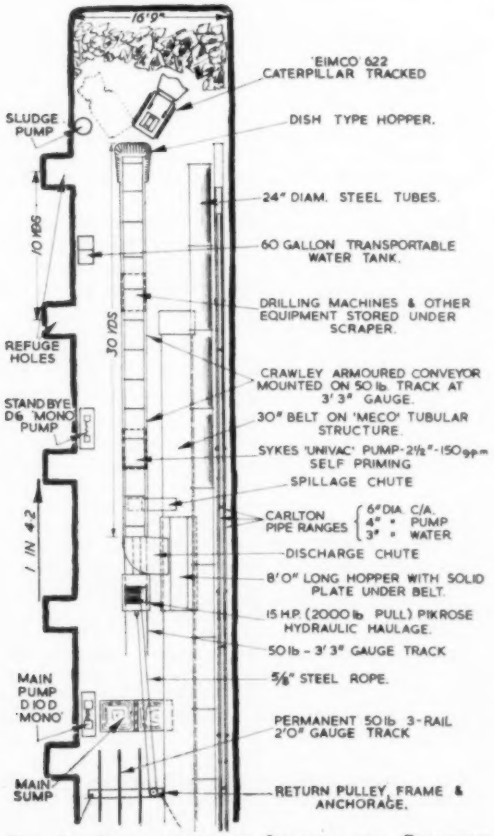

16'9"
'EIMCO' 622 CATERPILLAR TRACKED
SLUDGE PUMP
DISH TYPE HOPPER.
24" DIAM. STEEL TUBES.
10 YDS
60 GALLON TRANSPORTABLE WATER TANK.
DRILLING MACHINES & OTHER EQUIPMENT STORED UNDER SCRAPER.
30 YDS
REFUGE HOLES
CRAWLEY ARMOURED CONVEYOR MOUNTED ON 50 lb. TRACK AT 3' 3" GAUGE.
STANDBY D6 'MONO' PUMP
30" BELT ON 'MECO' TUBULAR STRUCTURE.
SYKES 'UNIVAC' PUMP-2½"-150 g.p.m. SELF PRIMING
SPILLAGE CHUTE
1 IN 4.2
CARLTON PIPE RANGES 6" DIA. C/A. 4" " PUMP 3" " WATER
DISCHARGE CHUTE
8'0" LONG HOPPER WITH SOLID PLATE UNDER BELT.
15 H.P. (2000 lb PULL) PIKROSE HYDRAULIC HAULAGE.
50 lb - 3' 3" GAUGE TRACK
MAIN PUMP D10D 'MONO'
⅝" STEEL ROPE.
PERMANENT 50 lb 3-RAIL 2'0" GAUGE TRACK
MAIN SUMP
RETURN PULLEY, FRAME & ANCHORAGE.

FIG. 9.—ARRANGEMENT OF LOADING AND CONVEYING EQUIPMENT AT THE FACE OF THE HAPTON VALLEY TUNNEL.

Burnley Area production manager the use of side-tipping cars, although convenient on the surface was not safe in the steep drift. He suggested that the belt conveyor which was to be used for coal transport in the completed drift should be installed immediately and utilized for dirt disposal. The gap between the loader and the belt was to be bridged with a 30-yd. long, side-discharging armoured conveyor, specially designed for the purpose (Fig. 9).

Despite the heavy maintenance and considerable spillage of dirt from the belt, this proposal was agreed and carried out. The men finally settled down to rhythmic tunnelling work. A contract price of £12 per yd. was offered and accepted by the men. An advance of 23 yd. in one week was accomplished and 25 yd. per week was expected in the weeks to come.

Organization

In many ways the organization of tunnelling work at Hapton Valley Drift was similar to that at Bank Hall Colliery. The shortage of manpower at the pit and in the Area was reflected in the austerity tunnelling teams. Out of the 12 tunnellers only eight had done drifting work some years before and the remaining men had no previous experience. The planned manpower for the loading into side-tipping cars at the face did not fundamentally change when the conveyor belt and armoured scraper were introduced. In the latter scheme, however, between 20 to 40 shifts were spent on maintenance in one week, including the weekend. Additionally, two men were employed on laying the permanent three-rail man riding track on steel sleepers.

The Eimco 622, caterpillar-mounted loader with a 13½-cu. ft. capacity bucket was a pronounced improvement on the conventional method of using two Eimco 21 loaders on ropes. The combined 24-h.p. of two traction motors and the 12-h.p. bucket motor, however, were inadequate for speedy filling out in the arduous conditions existing in the drift. The loader worked most of the time at its peak and there was no reserve power left when required.

The compressed air for the loader and drilling machines was supplied in 8-in. dia. Carlton pipes from three reciprocating and one rotary C.P. surface compressors producing in all about 1,000 cu. ft./min. of free air at a pressure of 100 lb./sq. in. Only three compressors worked at one time.

Despite the disadvantages referred to, the Eimco 622 loader is capable of achieving high tunnelling standards and outstanding yardages in shales on a dry floor and with an efficient organization. In the author's opinion two Eimco 622s or, preferably, a more powerful and robust loader similar to the 50-h.p. 1-cu. yd. capacity bucket traxcavator filling dirt out into 10- to 15-ton mine cars immediately behind, can accomplish 8 to 10 yd. advance in a 16-ft. 9-in. by 11-ft. dipping 1 in 4 drift each day.

The large cars mounted on two four-wheeled bogies would have to be placed across the drift in order to enable the complete filling of the car with

dirt. This arrangement of the equipment at the face calls for at least a 500-h.p. haulage engine to deal with big loads on dipping 1 in 4 slopes.

At Hapton Valley drift one Eimco 622 loader filled the dirt on to a 30-yd. Crawley, mobile armoured conveyor specially designed for the job. The armoured conveyor was mounted on 3-ft. 3-in. gauge, 50-lb. track. The lowering and pulling up of the scraper was achieved with a 15-h.p. hydraulic Pikrose haulage attached to the scraper structure. The performance of the armoured conveyor in shales was exceptionally good, but in sandstones difficulties were encountered. The hard stone frequently got between the chain and the sprocket, causing the chain to stretch and jump the sprocket teeth and break. To overcome this difficulty the colliery manager had an idea which was successfully applied while driving through the very hard abrasive and waterbearing sandstones.

Short strips of conveyor belt were bolted to the scraper flights, leaving the tail ends loose. The width of the belt fitted the scraper sections, thus covering the chain and flights completely. In this manner, the hard stone on the scraper was not dragged in the pans, but carried with ease on top of the chain which was well lubricated with fine, wet silt. This application of the belting required very careful attention and maintenance. From the scraper, the dirt was transported *via* a side chute and hopper by a series of belts supported by Meco tubular structure.

At the surface a bulldozer was used for levelling up the muckpile. The Meco tubular belt structure gave satisfaction and would do even better if the 30-in. wide belt was replaced with a larger size conveyor, as there was a considerable spillage of dirt on both sides of the belt.

The drift was supported with three-piece 16-ft. 9-in. by 11-ft. arches set at 3-ft. intervals and lagged with Pyrolith treated boards. The arches were secured continuously with $\frac{3}{4}$-in. dia. tie bars through the middle holes of the archplates, thus replacing the bolts. The tie bars used were 3 ft. 7 in. long for arches set at 3-ft. centres and were provided with a 6-in. threaded length and two nuts at one end and a 2-in. threaded length and one nut at the opposite end. The two-piece arches, as tunnel supports are preferable to three-piece, except when they cannot be transported through the shaft without further manhandling.

The following are the advantages of two-piece in preference to three-piece arches:—(1) Easier and quicker to set. (2) Safer in setting up. (3) Having only one joint are stronger and safer when set. (4) Have only one break in the lining in uppermost position, which can be easily and safely covered. (5) Form better road lining from the ventilation point of view. (6) Are lower in first cost by £1 5s. 4d. per arch. The three-piece arches at Hapton Valley drift were replaced as soon as the two-piece arches of the same size were available.

In addition to the usual drifting difficulties the continual water problem in the drift was acute. Excessive surface water caused by the wet summer and water feeders from the faulted areas led to a large make of water. All the men working in the drift wore rubber boots all the time and oilskins during most of the drivage. Four different types of pumps worked in the drift to deal with ever increasing water influx.

Despite the numerous difficulties which affected the drivage in the early stages, most of which have now been overcome, the project should produce some good results before it is completed. At the beginning too much was attempted with too few men in too short a time.

CONCLUSIONS

The factors leading to successful tunnelling are effort, efficiency, and economy. These were achieved in the Burnley Area with NCB personnel. I firmly believe that outstanding tunnelling results, impossible though they may seem, can be achieved in every pit with conventional equipment. We must not lack in perspicuity and must not have any doubt in the inherent qualities of leadership within our own organization.

Acknowledgments

The author wishes to thank Mr. R. Lowe, No. 4 (Burnley) Area general manager, for permission to read this paper and Mr. J. Whittaker, Area production manager, for his advice. Thanks are due also to Mr. W. E. Rawstron, No. 2 group manager, and Mr. H. Wood for help in preparing this paper and to Mr. E. Whatmore and Mr. A. L. Weir, the managers of Bank Hall and Hapton Valley collieries, respectively.

This work could not have been accomplished without the co-operation of Mr. F. H. Edge and Mr. E. W. Dear, Area planning engineers in Burnley and St. Helens, and their staffs, and Mr. A. B. Brown, who prepared the photographs. Mr. G. St. J. L. Goddard, and Mr. G. R. Purcell, divisional manpower officer. The opinions expressed in this paper by the author are not necessarily those of the National Coal Board.

Ceylon to Buy Russian Coal?

QUESTION of buying coal from the Soviet Union is being considered by the Government of Ceylon. Purchase of Russian coal would inevitably mean cuts in the quantities now being taken from South Africa, which is Ceylon's second biggest buyer of tea. Government officials fear that reduced purchases of South African coal would have serious repercussions on the tea market.

Last year when world tenders were called for the supply of coal, the two lowest tenders were from South Africa and China. But Russia is today offering coal at very cheap rates and Russian coal is considered to be of higher quality.

THE CALENDAR issued by Craven Bros. (Manchester), Limited, Vauxhall Works, Reddish, Stockport, commences with the month of July. Three months' figures are shown on each sheet and photographs of various items of the company's machines are used to illustrate the calendar.

The following notes are concerned with only a fraction of the work recorded in the annual report for 1960 of the British Iron and Steel Research Association and of that demonstrated at the "Open Days" of the BISRA laboratories at Sheffield on June 15 and 16. The association's income in 1960 was £945,599, an increase of £16,000 on 1959.

STEEL INDUSTRY'S RESEARCH

FEATURES OF BISRA ANNUAL REPORT AND "OPEN DAYS"

IT is interesting to note that BISRA's income from fees for sponsored work, royalties, and investment interest last year increased by £20,000. This fact, together with the list appended to the annual report of over 30 licensees for the manufacture and sale of plant and instruments developed by the association, constitutes but one of the outward signs of the good progress being made in co-operative research in iron and steel in the United Kingdom.

IRONMAKING

Blast-furnace Chemistry

SCICE, the apparatus in which a Stationary Charge can be studied In a Controlled Environment, has been constructed and brought to the fully operational stage. The first series of experiments is being devoted to examining the behaviour of self-fluxing sinter. One interesting result is that there was considerable decrease of strength of the sinter after it had been through the reduction cycle. It might be expected that this would, in practice, reduce the permeability of the burden in the lower part of the stack.

Blast-furnace Offtake Gas

During the year a method has been developed which enables a continuous, clean, dry gas sample to be obtained from the offtake of a blast furnace. Using this method continuous analysis of CO, CO_2, and hydrogen was carried out at a large basic blast furnace over a period of several months. Techniques were also developed for synchronized recording of other variables, such as cast time, top gas temperature and pressure, and blast temperature and pressure.

Fuel Injection

Much attention has been given to the problems involved in injecting fuel (gas, oil, or powdered coal) into the blast-furnace hearth, particularly to the steps which must be taken if furnace efficiency is to be maintained. Information about the use of fuel injection abroad has been collected and close liaison has been maintained with all those interested in this subject.

Blast-furnace Stoves

A consideration of blast-furnace stove operation has enabled certain basic heat balances to be better appreciated. The application of these balances to the operation of two, three, and four stoves in various ways has suggested methods by which extra blast heat might be obtained without having to increase the mass of stove brickwork. In order to verify these methods a small laboratory installation has been built which enables two, three, or four stove operations to be carried out. The operation of the stoves, which work over the same temperature range as normal stoves, has shown the validity of the basic heat balances. This installation has also helped to show what changes in design are necessary if higher blast temperatures are to be obtained, and emphasizes the need to increase gas burner capacities.

Work has now started on the installation of 30 couples at six equally-spaced levels throughout a new stove under construction. Special care is being taken to guard against failure caused by burn-out or rupture of the couples by brick expansion in the upper regions.

It is hoped that the temperature readings obtained, together with recordings of blast volumes, hot- and cold-blast temperatures, dome and stack temperatures, and gas and combustion-air volumes, will be collected by an automatic data logging system with punched tape output.

Flame Smelting

Anyone interested in this project who thinks it is being carried out in little more than bench size apparatus would do well to visit the plant sited at the Warrenby Works of Dorman Long (Steel), Limited (Fig. 1). It is a large well-instrumented plant of robust construction that suggests a produc-

tion rather than an experimental unit. This means, unfortunately, that modifications to design often involve extensive engineering work. As reported last year, the project has passed the stage of being able to produce molten iron or slag at will, that is, the high-temperature flame smelting reactor is a reliable unit. Attention has therefore been concentrated on using the hot reducing gases from the high-temperature reactor for the pre-reduction of the raw ore in a fluidized bed so that it will be partially reduced before it reaches the reactor. The dirtiness of the gas has caused difficulties and several modifications to the design of grid or distributor have been made, but further development design will be necesssary.

Design studies have been made for a production unit with an output of 200 tons of iron per day, and this has included an economic comparison between flame smelting and the blast furnace. For UK conditions the study suggested that flame smelting should produce cheaper iron but that the difference would not be very great. The design studies were supported by investigations on a quarter-scale perspex model and it was concluded that for a 200-ton/day unit multiple burner arrangements should be used rather than the single concentric burner of the present plant.

STEELMAKING

Spray Refining of Iron

Following promising results at the Sheffield laboratories in which 10 cwt. of molten iron was refined by atomizing with an arrangement of oxygen jets, a pilot plant for the treatment of hot metal by spray refining has been designed in collaboration with Richard Thomas & Baldwins, Limited, which has provided facilities for pilot plant experiments at its Redbourn Works (Fig. 2).

Batches of up to 16 tons of hot metal have been treated at rates of up to 2.5 ton/min, with oxygen flow rates ranging from 250 to 600 cu. ft./min. At low metal flow rates the metal can be adequately atomized and oxygen used very efficiently.

This spray-refining technique was effectively demonstrated by a water-air model with a perspex window at the recent " Open Days " at the Sheffield laboratories. It was stated that the spray-refining process achieves efficient and rapid desiliconization with the simultaneous removal of manganese chromium and vanadium. With the addition of powdered lime to the oxidizing jet dephosphorization of 25 to 30 per cent. at the 1.4 level can be achieved with an accompanying reduction in the loss of iron and manganese to the slag. The degree of prerefining can be regulated by varying the oxygen input per ton of metal. As with all oxygen refining processes, the spray-refining process produces heavy fumes and would require waste-gas cleaning equipment.

The development of the process is being directed towards increased throughput rates, increased phosphorus and carbon removal, reduction in fume produced, and continuous operation.

Converter Furnace Control

The planned increase in the use of oxygen steelmaking processes in the UK has led to considerable interest in studying means for improved controls for converter furnaces. Some progress has been made in other countries, notably the US and Holland, in controlling end-point conditions by measuring and closely regulating weights, proportions, and temperatures of the ingredients charged into converters. It is claimed that the systems devised have significantly reduced the number of heats finishing outside the specified tolerance. The Physics Department, Automation Section, has studied these systems and has issued a comprehensive report containing detailed proposals for a system of control for an LD furnace which includes the best features of the systems in use and also some improvements in computing technique.

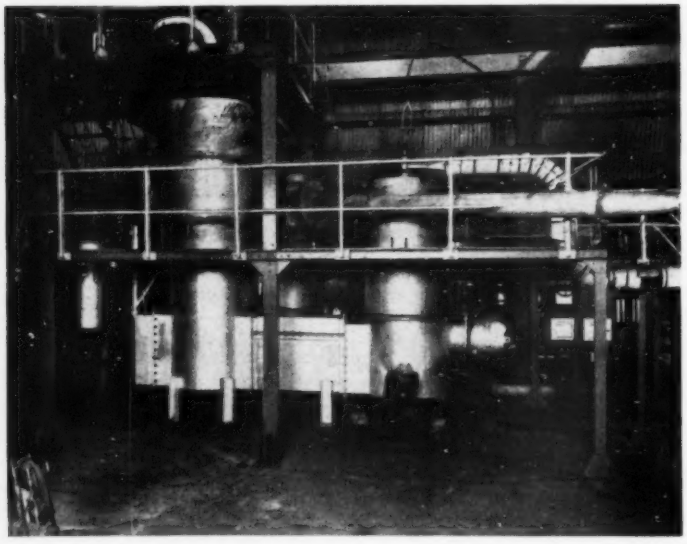


FIG. 1.—PILOT PLANT FOR THE STUDY OF THE REDUCTION OF IRON ORE BY THE FLAME-SMELTING PROCESS. THE TALL COLUMN ON THE LEFT CONTAINS THE FLUIDIZED BED AND TO THE RIGHT IS THE HIGH-TEMPERATURE REACTION UNIT.

Electric Steelmaking

After successful trials on the BISRA experimental furnace and on a 5-ton electric-arc production furnace, a member firm

has built and satisfactorily worked its own model of the BISRA automatic power input controller (APIC). A controller has also been installed for trial on a 30-ton furnace at another member's works. The controller, which limits the high-voltage period to pre-set times, has worked satisfactorily and has achieved a reduction of electrode consumption of 2 lb./ton of steel and reduction of electricity consumption of 25 to 50 kWh/ton.

Proposals for the application of automatic power control are at present being discussed with other electric steelmakers. A simple form of APIC has been designed for use with modern furnaces having on-load tap changing and tap pre-selector switch gear. This equipment is now being manufactured by four UK firms.

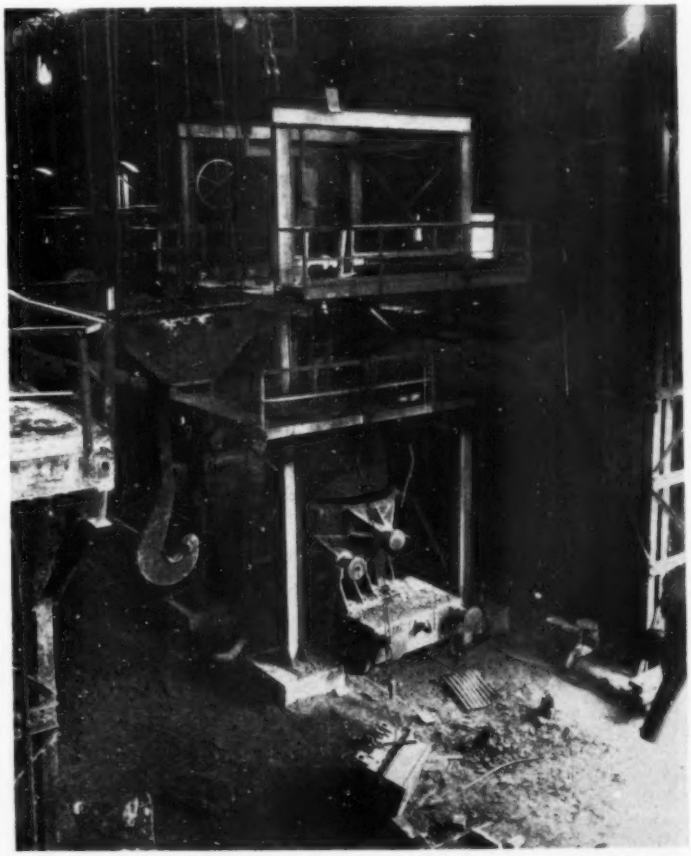
Continuous Casting

Continuous casting of steel was demonstrated by BISRA when, on each of its three "Open Days" a 1-ton heat of steel was cast on the BISRA machine in the Sheffield laboratories for the benefit of the visitors. It is still a rare process to see, but it should be remembered that BISRA gave demonstrations on this plant on three successive days when the laboratories were open to visitors five years ago. A new feature on this occasion was that below the withdrawal rolls the ingots were bent and run-out horizontally. These demonstration heats were of En 5 steel cast to 3-in. square sections at 10 ft./min.

A good impetus to further development of this process has come from the decision of the Steel Company of Wales, Limited, to install a twin-strand continuous casting machine for the production of slabs up to 48 in. wide. This company has provided facilities for continuous casting research in its works and BISRA has transferred one of its machines from Sheffield to the Abbey Works.

After casting eight 24-in. by 4-in. slabs on this machine, modifications were made for casting 27-in. by 5-in. slabs in a bolted mould of conventional construction. Seven slabs of this size have now been cast; some are being sectioned for examination and one has been rolled successfully to sheets. A 27-in. by 5-in. mould of brazed construction is to be tried next and its performance, particularly with regard to heat transfer and friction will be compared with that of the bolted mould.

A major step forward in increasing the production rate of continuous casting has been achieved by the development of an entirely new method based on a multiple mould designed and patented by the Continuous Casting Company and BISRA. The recent "Open Days" exhibits of steel continuously cast on the BISRA machine at Sheffield included a length of a multiple section comprised of three 3-in. squares of En 5 steel cast by this method. Known as the "Weybridge" process, it will enable 8-in. to 10-in. sq. sections to be cast at rates of 50 to 60 ton/hr./strand. (A full description of this process was published in IRON AND COAL, April 7, 1961.)



[Courtesy, Richard Thomas & Baldwins, Limited.

FIG. 2.—PILOT PLANT FOR SPRAY-REFINING OF HOT METAL. MOLTEN IRON FROM A TUNDISH ON THE UPPER PLATFORM IS ATOMIZED AS IT PASSES THROUGH A RING MANIFOLD WHICH PROVIDES A NUMBER OF HIGH-VELOCITY OXYGEN JETS AND WHICH IS SITUATED ON TOP OF THE FUME-EXTRACTING HOOD. THE REFINED METAL FALLS INTO THE TRANSFER LADLE BELOW.

MECHANICAL WORKING

Automatic Forging

The feasibility of making a forging by programme has been successfully demonstrated during the year on the experimental forge at the Sheffield laboratories. The forging of an ingot into a bar with three parts of different dimensions took about 6 min., compared with an estimated 15 to 19 min. on a conventional plant. Savings, both in time and in heating costs, are likely to be even greater with more complicated forgings, and the next phase of the work will be to install what is virtually an industrial prototype programmer capable of making a wide range of forged shapes. Substantial improvements to the linked control systems of the manipulator and press are necessary to enable its performance to match the programming requirements, and a comprehensive scheme for this has been worked out and is being developed jointly with two associate member firms.

Rapid Continuous Annealing

An important advance in tinplate manufacture is within sight as the result of research into continuous annealing of strip. A new process has been evolved which is likely to reduce greatly the capital cost and space of annealing plant, and bring even more substantial savings of heating costs. The process has the further merit that the stiffer grades of tinplate for can tops may be made from the standard quality of tinplate steel, so that the production of re-phosphorized steel for this purpose is unnecessary.

Can-making trials with material annealed on the 5-in. gas-fired plant at Sketty Hall confirmed that the properties of temper universal for tinplate can be achieved with a processing time of less than 10 sec. The opportunities for rapid heating and cooling at higher strip speeds have now been exploited in a more advanced experimental plant, also for 5-in. wide material (Fig. 3). The first pilot production plant is now being planned for installation at a member's works. This will be capable of processing strip up to 27 in. wide on an experimental basis.

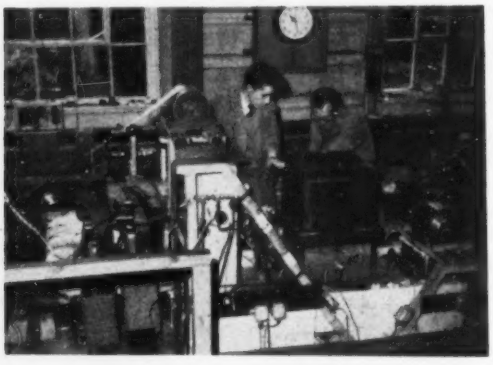


FIG. 3.—EXPERIMENTAL CONTINUOUS ANNEALING LINE WITH LEAD-BATH HEATING. A FULL-SIZE PLANT FOR 27-IN. WIDE BLACKPLATE WOULD BE ONLY SLIGHTLY LARGER THAN THIS 5-IN. LINE.

Rod and Bar Rolling

An optical instrument developed for continuous in-line monitoring of the dimensions of hot-rolled rods and bars has been licensed to the Davy & United Instrument Company, Limited, for commercial manufacture.

Aluminium Coating of Steel Strip

An entirely new process for producing aluminized steel strip has been developed at BISRA's Swansea laboratories. The coating is made by electrophoretic deposition of aluminium powder followed by rolling and heat treatment. The work up to the present has been confined to the production of small samples, but a 5-in. experimental line is now being constructed at Sketty Hall in order to make material for user assessment and to work out technological details.

When produced under the the optimum conditions, the properties of the new aluminium coated steel (Elphal) are most attractive. The coating is uniform and thickness can be controlled to fine limits over a wide range. There is very little alloy present, and porosity is so low that the surface can be anodized. The steel can be quite severely deformed without deterioration of the coating. The raw aluminium powder costs 50 per cent. more than the ingot aluminium used in hot dipping, but this is offset by the fact that so little alloy is present and that the coating is much more uniform in the powder-based product.

PLANT ENGINEERING AND ENERGY

Fluidized Beds

Investigations of a fluidized-bed heating system on a small laboratory scale showed that it was possible to heat small steel blocks to 1,000 deg. C. with a thermal efficiency of 39 per cent. The problems involved in scaling up this technique for possible application to steel ingots will be studied.

Experiments have also been carried out on the cooling of ingot moulds in a bed of sand fluidized by air blowing. Results have shown that cooling rates can be seven times as fast as natural cooling, but it has not yet been possible to establish whether this type of cooling will affect mould life. Pilot plants, in which 3-ton and 100-ton moulds can be cooled, have been designed for trials at the works of member firms.

Burners

Qualitative tests of a variable-throat burner on an open-hearth furnace have shown that the burner has a turndown ratio greater than 20:1, *i.e.*, the burner will retain its characteristic high oil/steam ratio when the fuel supply is reduced to a twentieth of the normal rate.

Isolation of Ground Vibrations

The transmission of vibration from sources of vibration, such as forging hammers and drop stamps, to the surrounding ground is an important issue and work on this problem is proceeding in

three ways:—By tests on full-scale foundations with a view to providing design data for new forge foundations and reducing the vibration transmission from existing installations; by tests on a laboratory model, and by theoretical analyses with the aid of the computer.

METALLURGY

Degassing of Molten Steel

An important exhibit at the "Open Days" was the pilot vacuum degassing plant for the continuous treatment of molten steel recently installed in the Sheffield laboratories. The principle of this process is that a stream of molten steel will flow upward under a ferrostatic head into an evacuated chamber where it will disperse as a spray and be efficiently degassed and then collect in the bottom and flow down through a barometric leg to a tundish below the vacuum chamber.

A preliminary trial of the plant using molten cast iron has given promising results.

Jet Degassing

A substantial advance has been made in the use of carrier-gas techniques for removing hydrogen from molten steel. It has been found that by directing a jet of the inert gas on to the surface of the molten metal the hydrogen content is reduced to a low level in a short time. In the laboratory induction furnace the hydrogen content of 80-lb. melts has been reduced from 8 ppm. to 1 ppm. in about 10 min. The method has been called "jet degassing."

Previous methods of gas flushing in which the gas was bubbled through the metal have proved incapable of reducing the gas content to less than 3 ppm. The reason for this seems to be that when the gas is injected below the surface of the metal the slag and metal are intimately mixed and hydrogen is continuously transferred through the slag into the metal. When the jet is directed onto the surface the slag is swept to one side and plays very little part in the reaction.

Theoretical calculations suggest that 1 ppm. is the limit to which the hydrogen can be reduced by jet degassing, but this should be adequate for most commercial purposes. Work is proceeding to improve the efficiency and lower the cost of the technique.

Niobium in Steel

The investigation started last year into the effect of niobium on the properties of steel has been continued. Notch ductility is a property which is particularly sensitive to the addition of niobium. Results plotted (Fig. 4) show the effect of niobium on the 40-ft.-lb. impact transition temperature of vacuum-melted and air-melted 0.17 per cent. carbon, 0.8 per cent. manganese experimental steels in the as-rolled and normalized conditions. The transition temperatures of these steels were reduced by the addition of 0.05 per cent. niobium, and, with the exception of the vacuum-melted as-rolled steel, the reductions were substantial, being of the order of 50 deg. C. Further additions produced a gradual reduction of transition temperature with vacuum-melted steels, but had little effect on the air-melted steels.

Steel Analysis

The use of X-ray fluorescence spectrometry for analysis of highly alloyed steels has shown that, although the precision is high, inter-element effects are appreciable. A calculator which allows for these effects has been produced and patented.

Inspection of Steel Strip

A method has been developed, in collaboration with Kelvin & Hughes, Limited, for the continuous inspection of strip for lamination defects and grading of sheets after the shears, or at the other appropriate points along the line; it needs only one twin probe to inspect the full width of the strip (Fig. 5). The twin probe, containing transmitter and receiver in one unit, is located near one longitudinal edge of the sheet. The transmitter fires ultrasonic pulses across the width of the sheet, and echoes from lamination defects and from the far edge are received by the detector. The amplified echo signals are displayed on a cathode ray tube monitor and can be used to trigger a reject gate whenever the signal amplitude exceeds a preset limit. Acoustic coupling between probe and steel surface is through a film of oil. When inspecting discrete sheets the probe is automatically lowered on to the front and raised when the tail arrives.

Trials of the equipment have been carried out on a sheet inspection line at a member's works and good results obtained at a line speed of 80 ft./min. Comparisons between defects shown by the instrument and laminations in the sectioned sheet observed under the microscope show good agreement. The instrument is now being developed for use at line speeds up to at least 300 ft./min.

Work has proceeded on two lines of development of instrumental aids to inspection of moving tin-

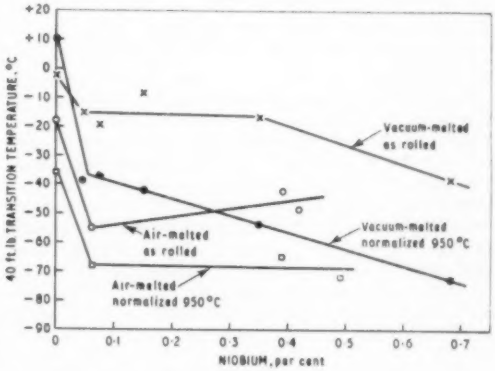
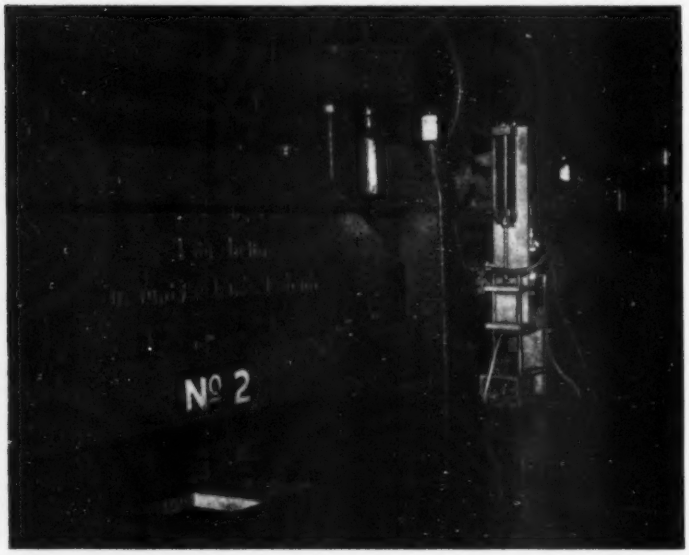


FIG. 4.—THE EFFECT OF NIOBIUM ON THE 40-FT./LB. IMPACT TRANSITION TEMPERATURE OF VACUUM-MELTED AND AIR-MELTED MILD STEELS.



[*Courtesy, John Summers & Sons, Limited.*

FIG. 5.—THE BISRA/KELVIN & HUGHES LAMINATION DETECTOR INSTALLED ON A CUT SHEET INSPECTION TABLE AT JOHN SUMMERS & SONS, LIMITED. THE SLOT CUT IN THE TABLE IS TO PREVENT LOSS OF ULTRASONIC ENERGY INTO THE MATERIAL OF THE TABLE.

plate. The first consists of a multichannel photoelectric instrument which will actuate a sheet-sorting gate or produce a record of faults in a coil. A 10-channel experimental instrument, to inspect 1 ft. width of the tinplate has been completed. It includes a strip light source to provide illumination normal to the surface, and photocells arranged to receive only off-specular, diffusely reflected or scattered light from the tinplate surface.

Trials of the apparatus are proceeding at a member's works to obtain recordings of the signals due to all usual surface defects and thence to correlate the magnitude and character of the photoelectric signals with the inspector's assessment of the severity of the defects.

The second line of approach is the development of a visual aid to inspection by providing an optical system of image arresting and closed-circuit TV for viewing the stopped section of moving strip. An apparatus has been set up consisting of a system of illumination and a TV camera so arranged that only light scattered from the tinplate surface at a well-defined angle off-specular reaches the camera. This has shown that although the camera is mounted some 12 ft. above the tinplate sheet small surface defects show up clearly on the TV monitor on a dark background.

Air Pollution

The Chief Alkali Inspector has now clearly expressed his opinion that all steelmaking processes making regular use of oxygen for refining must be fitted with gas-cleaning plant, and that, as a general rule, the cleaners used should reduce the fume loading in the exit gases to the equivalent of 0.05 grn./cu. ft. at s.t.p. (60 deg. F. and 30 in Hg). Therefore, in collaboration with the Air and River Pollution Committee of the British Iron and Steel Federation, the problems of collecting and cleaning the gases from electric-arc furnaces, converters and open-hearth furnaces are being assessed so that the best guidance can be given to the industry.

Visits to the United States and Germany have been made to study gas-cleaning plants on converters and open-hearth furnaces. These visits have illustrated that the handling and disposal of collected dust and fume must be considered in conjunction with the choice of cleaning plant. Unless the dust disposal facilities are properly engineered, the fume-cleaning plant will become choked and cease to operate. Depending on the choice of cleaner and on local conditions, the fume can be obtained from the collector dry or as a slurry. Some experience with wet scrubbers abroad has shown that the wash water can be successfully clarified when mixed with blast-furnace effluents going to the thickeners and filters. Work will continue with a view to advising member firms on the best means of disposal and possible uses of collected dust and fume in specific circumstances.

Calculations and laboratory experiments indicate that gas cushioning is technically feasible and economic for the support of light-gauge strip passing through a processing line. The conventional assemblies of rollers would be replaced by a series of guide surfaces with a cushion of gas between them and the moving strip. The cushion is formed by injecting, via suitable nozzles, a quantity of low-pressure gas between the strip and the guide surface. The resulting great reduction in friction losses and the elimination of rolls with high moments of inertia means that less power will be required to move the strip, especially during speed changes; also, the strip need not be under high tension to preserve correct track and its surfaces would not be marked by contact with rolls. Gas-cushioning systems offer possibilities of novel forms of plant design, leading to a more compact processing plant, and consequent reduction in capital costs.

Supply of Operational Research Workers

A graduate apprentice scheme has been started to provide graduates with practical and theoretical training extending over two years, and to form a

nucleus of men with the basic professional qualities necessary for successful operational research. The first year of the course is spent with BISRA project teams working on actual studies, taking part in training exercises concerned with oral and written reporting and, if necessary, attending lectures in mathematics and statistics. The second year consists of a full-time course of lectures at the London School of Economics, leading to a diploma in operational research. It is hoped that successful apprentices will accept permanent employment in BISRA or with member firms.

Effect of Forge Mechanization on Productivity and Other Economic Factors

Studies at a particular jobbing forge are in hand to develop methods of scheduling work through the forge which will allow greater utilization of equipment so as to take full advantage of the automatic equipment being developed by the Mechanical Working Division. First a stockholding and re-ordering policy has been formulated for raw materials. The policy is self-compensating for changes in demand variations and delivery times and is sufficiently straightforward to be directly implemented by a clerk. The company concerned is putting the system into operation forthwith.

Secondly, assuming this raw material policy, a method of scheduling jobs through the forge is now being devised. An analysis of past job records is now being carried out to establish how predictions can be made of the forging treatment any particular job will require and how accurate such predictions would be in practice.

Operational Studies of Integrated Systems

The wider aspects of controlling production through an integrated steelworks have been studied during the year. In particular, the effects of matching order pattern to productive capacity, stocking policies, production scheduling, and process-operating rules have been considered. It is hoped to find the area of optimum feasible production-control policies, and to this end a mathematical model is being developed.

Data from several works have been collected and are being analysed to determine the statistical parameters for the structural elements of the production schedule.

A comprehensive study of the general factors affecting reliability is being made and topics for further research have been suggested. Present methods of combating unreliability are being studied, together with possible ways of improving their efficiency. For example, work on wire-drawing dies has shown that thicker dies (in the early part of the process) wear out, but the dies in the later part fail at random.

Pegasus Computer

During the past year, the Pegasus computer has been used for about 50 hr. of productive work each week, and approximately 40 per cent. of this time was hired by 14 member firms. Unscheduled repair and maintenance was negligible and productive time wasted for all reasons was less than 1½ hr. per week.

Many small and medium-sized programmes have been produced. The bulk of these is for Monte Carlo simulations, for convolutions of distributions, and for cost equation calculations.

Safety First

The Human Factors Section has several studies in progress relating to the causes of accidents and accident prevention. A member of the section is acting as observer for the BISF on the Human Factors in Safety Committee of the European Coal and Steel Community, which is investigating the genesis of accidents.

Development and Information Services

Commercial interests are increasingly being brought in at the early stages of BISRA projects, not only to stimulate industrial interest, but also because such close contact in the initial and intermediate stages helps to reduce the gap between the end of research and the commercial development of an invention. During 1960 a number of licence agreements have been completed with member firms and others.

Licensees have been encouraged to take full advantage of their oversea rights, and the results of this policy are now beginning to emerge. For example, the Davy & United Engineering Company, Limited, the licensee for automatic-gauge control, and its sub-licensees, have either completed or are building some 27 automatic-gauge control installations, and negotiations have been started or completed for the granting of sub-licences in Germany, Japan, Switzerland, Canada, and in the United States.

A great deal of interest has been stimulated oversea by the progress of the BISRA continuous-casting process, the value of which is shown by the continuous-casting plant being built for the Steel Company of Wales by the Continuous Casting Company. Negotiations are already in progress for the manufacture of this type of plant in the US and elsewhere. The system for automatically controlling the power input to electric-arc furnaces (APIC), which is the subject of several licences in this country, has also created interest abroad, and licences are being negotiated in the US, Germany, and France.

Licences for certain aspects of the automatic forging system have been granted in this country, and as there is already some interest abroad the opportunity will be taken to negotiate suitable licences in due course.

The development of the vacuum degassing project is being assisted by B.H.D. Engineers, Limited, which is providing pilot plant equipment in return for an option on a licence to manufacture and sell the equipment both at home and oversea.

Another project which has aroused considerable interest is the versatile electrolytic pilot line which was originally developed at Sketty Hall as a research tool. It clearly has commercial possibilities, and the Electro-Chemical Engineering Company has taken up a licence to manufacture and sell the equipment in this country and abroad.

Removal of Blast-Furnace Stack Scaffold

A BLAST-FURNACE scaffold was successfully removed by blasting recently at the Ebbw Vale Works of Richard Thomas & Baldwins, Limited, after the stockline in the furnace had been lowered 50 ft. It is believed to be the first time that such an operation has been undertaken in this country. The scaffold on "B" furnace, estimated to be in excess of 100 tons, was in places 6 ft. thick, and stockline movement was, as may be expected, erratic, dust losses high, and furnace efficiency poor.

Many methods of removing scaffolds have been studied by Ebbw Vale personnel, but the majority suggested and tried in this country have gained little or no reward. However, methods developed by German and Dutch blast-furnace operators, although hazardous, have been more successful. Their practice is to determine the extent and position of the scaffold by a series of test drillings in the stack. The stockline is then dropped below the scaffold to remove peripheral support, and blasting takes place from the bottom upwards. Excess coke is charged below and above the material blasted to ensure satisfactory smelting.

Detection drillings were made at Ebbw Vale with the furnace on blast, this technique being first developed on "A" blast furnace prior to relining in 1960, and subsequently improved on "B" furnace before the recent blasting.

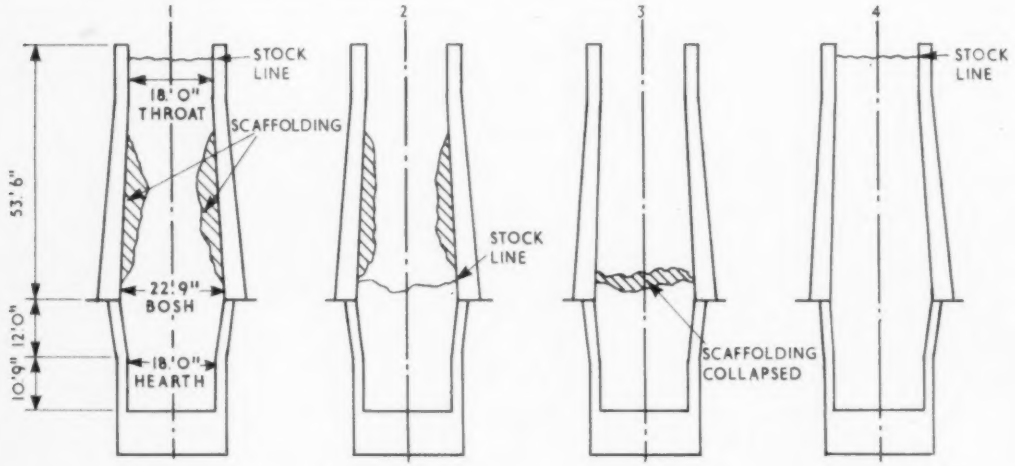
The lowering of the stockline and the actual hot blasting with polar ammon gelignite is potentially hazardous. The operation, therefore, necessitated careful planning and collaboration between the blast-furnace management of the Royal Dutch Steelworks at Ijmuiden, the explosives department of Imperial Chemical Industries, Limited, and Ebbw Vale personnel.

During the blowdown steam lances were inserted in the stack to prevent the infiltrating of air and the formation of an explosive gas mixture. Water sprays were also used to control top gas temperatures. After a correct stockline had been reached ports were opened above the level of the burden and the gases rising from the coke bed were ignited by coke-oven gas burners. Blasting holes which had been previously prepared were then reopened. Meanwhile, the large bell was dropped and slung to one side of the hopper to allow an inspection of the scaffold profile from the top of the furnace. It was possible to follow the success of each blast from this vantage point as well as by measuring wall thickness. A total of 53 lb. 8 oz. of explosives were used in 11 salvoes before the scaffold was judged to be entirely removed. The shattered pieces of the scaffold were at this stage clearly visible against the incandescent coke bed.

After purging the stack with steam the furnace was put on blast and the stockline was gradually raised to a normal level within 10 hr.

It will be some time before a full assessment can be made of the beneficial effect of the operation, however, present indications encourage considerable optimism.

The furnace driving has been much improved with operation on full-wind volumes now possible, and dust losses are reduced to one third of the former value.



Bromford Iron & Steel Company Developments

OPENING OF NEW PLANT

First fruits of an expansion policy adopted by the board of the Bromford Iron & Steel Company, Limited, West Bromwich, three years ago were seen at the official opening, by Mr. F. J. Erroll, Minister of State, Board of Trade, of a new cold-rolling mill and fabric mesh reinforcement factory. The presence of Mr. Erroll was significant; the company has set out to enhance its export trade. In fact, Mr. C. Cooper, the chairman, was able to announce that the company's exports for the month to date (July 18) had totalled 870 tons of steel in various forms to customers in 15 countries.

THE new 8½-in. and 20-in. by 26-in. four-high non-reversing mill (Fig. 1) is by W. H. A. Robertson & Company, Limited, and is capable of rolling steel strip from 0.080 in. to 0.156 in. thick and from 8 in. to 20½ in. wide. It has increased the company's existing capacity for cold-rolled strip and will take total steel production up to approximately 5,000 tons per month. The maximum rolling speed of the new mill is 400 ft./min. and the mill will produce coils in weight up to 5 cwt./in. of strip width and 62 in. maximum outside coil diameter. Feed to the mill is from a decoil box which takes the coils ready for rolling, and a feeding machine which is fitted with a pair of 5-in. dia. pinch rolls and a 5-in. dia. bending roll for removing the curvature from the strip as it uncoils.

To deal with the increased output from the new mill, the existing heat-treatment plant has been augmented by the installation of four new Birlec inert atmosphere bell furnaces.

A New Venture

The production of welded mesh fabric for concrete reinforcement is a new venture for Bromford, but is a diversity which has been planned for some time.

The new factory for this purpose, erected on land near the rolling mills, houses the entire equipment in two bays—one (200 ft. by 50 ft.) contains the main mesh production line, while the other (100 ft. by 50 ft.) is available for the stocking of material and preparation. In addition, there is a loading bay and offices. The plant (Fig. 2) produces the complete range of wire mesh to BSS 1221, Part A, from the raw material, which is hot-rolled steel rods in coil form.

The hot-rolled rod is drawn into wire of gauge suitable for the mesh on a gravity block made by Sir James Farmer Norton, Limited, Salford (Lancs).

This machine, which has drawing speeds of 400, 600, and 800 ft./min., will handle rod up to a maximum of ½ in. dia. and draw it to wire down to a

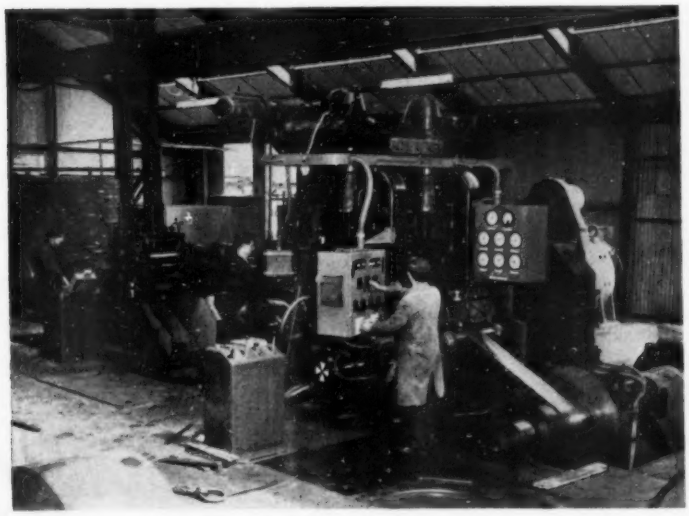


FIG. 1.—THE NEW COLD-ROLLING MILL INSTALLED AT THE BROMFORD IRON & STEEL COMPANY, LIMITED, BY W. H. A. ROBERTSON & COMPANY, LIMITED, BEDFORD. THIS IS A 8½-IN. AND 20-IN. BY 26-IN. FOUR-HIGH NON-REVERSING MACHINE.

minimum of 14 s.w.g. (0.080 in.). Drawing is by the normal method, but the finished wire is discharged below the machine, which is mounted well above floor level. By this method it is possible to produce coils of 1 ton.

The operator is assisted in the removal of the coils by an air-ejection mechanism, and it is possible to remove the coils and continue drawing in about half a minute. One-ton coils enable the welding machine to make longer runs. The wire coils are loaded onto turntables at the start of the mesh production line. There are sufficient turntables to ensure that any number of main wires can be fed to one machine according to the type of mesh in production. The mesh welding machine, manufactured by Entwicklung und Verwertung Gesellschaft, Graz, Austria, consists of a wire straightener, a cross-wire feeding mechanism, multiple electric welding heads, traction mechanism for drawing the completed mesh through the machine, edge trimmers and slitters, a cross shear for cutting the mesh into sheets, and roll equipment should the mesh be required in roll form instead of cut lengths.

When the main wires are fed into the machine they pass through the straightening rolls, and then beneath a feed hopper mechanism which places the cross wires in position. The latter are cut to length and straightened in a separate machine before loading into the hopper.

The main wires are drawn forward in a series of steps beneath the welding heads which are carried on a cross beam. The beam makes a downward movement to bring the upper electrodes into contact with the wire cross points; the welding is completed and the beam then returns to its upper position. The welding heads can be very rapidly adjusted to suit the entire range of mesh sizes. The cross-cut flying shear is hydraulically driven and cuts the finished mesh into required lengths.

If needed, the shear can be left idle and the mesh is rolled on to a collapsible mandrel for delivery in rolled form.

This new venture—a complete factory with up-to-date machinery—cost approximately £100,000. Its product is already in demand for concrete reinforcement.

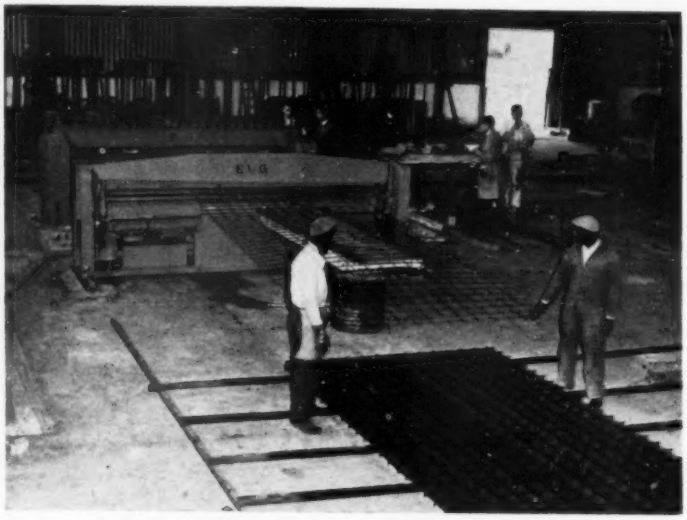


FIG. 2.—THE COMPLETED MESH CUT TO REQUIRED SIZE ADDS TO THE STACK READY FOR THE CRANE.

JOHN THOMPSON GROUP'S NEW LONDON OFFICES

COMPLETE London sales organization of the John Thompson group of engineering companies is now centralized in Tavistock House East, Woburn Walk, Duke's Road, off Tavistock Square, London, W.C.1. Previously, some group companies were housed in Imperial House, Kingsway, W.C.2, while others were in various parts of London.

Seventeen home companies are now represented in the new offices. Wolverhampton remains the head office of the group and for the majority of individual firms, but among the companies which have recently entered the group and are represented in the new London office are Thompson Bros. (Bilston), Limited, Darham Industries (London), Limited, John Thompson Compost Plant, Limited, and Thompson-Tappan.

The new building forms a new east wing to the extensive Tavistock House of the British Medical Association. Care has been taken to match the original building and tone with the architectural styles of the neighbourhood. Internally, the floor area has been divided into offices by steel partitioning and throughout there are acoustic ceilings, incorporating radiant heating, and flush lighting.

A room has been set aside in the new offices to display photographs and models of the main products of the group.

New Literature

REFERENCE is made below to some of the house magazines, catalogues, booklets, and other publications received. Readers wishing to obtain a copy of any of the items should write to the address given, at the same time mentioning this journal.

INCANDESCENT HEAT COMPANY, LIMITED, Cornwall Road, Smethwick, Birmingham—"High Purity CO_2 from Waste Flue Gases" has been published as reprint 508.

HENRY WIGGIN & COMPANY, LIMITED, Thames House, Millbank, London, S.W.1—"Wiggin High-nickel Alloys in Pickling Plant" is a new publication covering the selection of the most efficient materials for use in the handling equipment of the pickling process. It is illustrated and contains many working drawings.

ENGINEERING AND BUILDING CENTRE, Stephenson Place, Birmingham 2—A report of the 1961 Poznan International Fair is among the items in the June/July issue of News Letter. About 100 British firms, including manufacturers of mining equipment, textile machinery, fork lift trucks, diesel engines, etc., were represented at the fair.

REINFORCED CONCRETE ASSOCIATION, 94/98, Petty France, London, S.W.1—Of the various papers in the June issue of the association's journal, Reinforced Concrete Review, one on the "Effect of Non-tensioned Steel in Prestressed Concrete," the author of which is Dr. P. W. Abeles, will have a special interest for readers of IRON AND COAL.

NATIONAL UNION OF MANUFACTURERS, 6, Holborn Viaduct, London, E.C.1—The European Common Market and the centenary of the Birmingham Small Arms Company, Limited, are among the subjects of articles in the July number of the British Manufacturer (2s.), which also contains many other items designed to interest the industrialist and businessman generally.

BRIGHTSIDE ENGINEERING HOLDINGS, LIMITED, Eccles-field, near Sheffield—Buckley & Taylor, Limited, Oldham, a member of the Brightside group, supplied the distillation plant for the National Coal Board's 230-ft. high offshore drilling tower which, for two and a half years, has been probing the rich coal seams beneath the sea off the Durham coast. An article on the subject appears in the summer number of the Brightside News, which contains many other features of interest.

J. BROCKHOUSE & COMPANY, LIMITED, 25, Hanover Square, London, W.1—Something of the colourful background surrounding the production of the familiar angle iron, basic ingredient of the traditional iron bedstead, is revealed in "Angle on Production," an interesting article in the July/September issue of the Forge. Another, slightly more technical, feature describes some of the problems connected with the provision of adequate braking on semi-trailers and gives details of some systems in current use.

LANCASHIRE DYNAMO & CRYPTO, LIMITED, Willesden, London, N.W.10—Full information concerning the company's British Standard totally enclosed fan-cooled cage rotor motors is contained in leaflet SL.1. The motor is impervious to dust and fumes and is particularly suitable for use in the presence of corrosive chemicals, damp, and dirt. It can be adapted, at a small extra charge, for operating in the open under all weathers. The additional protection thus offered obviates the need for any further form of enclosure.

MAVOR & COULSON, LIMITED, Bridgeton, Glasgow—Much has already appeared in print on the Scottish Gas Board's first Lurgi high-pressure complete gasification plant in Britain, but the subject remains topical and an article in the summer number of the M&C Apprentices' Magazine (3d.) will be found of considerable interest. Much of the space in the magazine is devoted to personal news of M&C apprentices and members of the staff generally, but there are articles and other features likely to have wider appeal.

STURTEVANT ENGINEERING COMPANY, LIMITED, Southern House, Cannon Street, London, E.C.4—Publication 6003 is a leaflet on "Sturtepak Anodes." These anodes can be used to protect service pipes and well-wrapped large pipelines, filling stations, depots, and tank farms, and for the suppression of interference corrosion and provision of combined earthing and cathodic protection. From the same company comes "Paddle Bladed D Fans" (publication 2605), a brochure superseding publication 2604, which is now out of print.

INTERNATIONAL COMBUSTION PRODUCTS, LIMITED, 19, Woburn Place, London, W.C.1—"Foundry Mechanization" is the title of publication No. M 614, which describes the extent of the company's activities in the field. For the past 25 years International Combustion has been closely concerned with the design and manufacture of foundry equipment. Now, as suppliers of plant for foundry mechanization, facilities are offered for metal melting, sand preparation and handling, mould and core production, and casting cleaning.

HEAD, WRIGHTSON & COMPANY, LIMITED, Ship House, 20, Buckingham Gate, London, S.W.1—From the development work that has been conducted in connection with the company's established gas-cleaning equipment, wet and dry plate and tube precipitators, Head Wrightson is now in a position to offer a full range of high-performance cyclone separators varying from standard units to "tailor-made" separators for special applications. "Gas-cleaning Cyclones by Head, Wrightson," a new brochure, gives some details of this type of equipment which is now available.

SAMUEL OSBORN & COMPANY, LIMITED, Clyde Steel Works, P.O. Box No. 1, Sheffield 3—The summer number of Hand and Heart is the last to be edited by Mr. Dennis Scorah, who made a number of improvements in the magazine (a notable one was to enlarge the page size) during the 18 months he held the position. His successor is Mr. Eric Bunting. Mr. Scorah's policy has obviously been that names make news and the current issue, like the others under his guidance, is packed with information about employees of the group, space also being found for two or three short articles.

HOT DIP GALVANIZERS ASSOCIATION, 34, Berkeley Square, London, W.1—"Corrosion Resistance of Hot Galvanizing" is the title of a new booklet produced by the association. It is, in fact, the first in a new series of technical booklets and is intended to give engineers, architects, and designers up-to-date and accurate information on the performance of hot galvanized coatings in various environments—in contact

with fresh and sea water, with oils, chemicals, building materials, in agricultural conditions, and underground. The advantage of using heavy coatings to obtain more complete protection against rust is stressed.

BRITISH CAST IRON RESEARCH ASSOCIATION, Alvechurch, Birmingham—In addition to the usual features, the July number of the BCIRA Journal (£6 6s. per annum) contains six reports. They are:—"Behaviour of Clay-bonded Sands in a Foundry," by W. B. Parkes; "Influence of Chromium Content on Chill and Mottle Formation," by J. W. Boyes; "Chilling Mechanism of Chromium in Cast Iron," by W. Oldfield; "Dimensional Accuracy and Soundness of Grey-iron Castings Produced in Green Sand Moulds," by K. E. L. Nicholas and W. R. Roberts; "Creep Tests on a Flake Graphite Cast Iron at 350 deg. C.," by K. B. Palmer, and "Residual Thermal Stresses in Compression Ignition Engines," by A. Dearden.

STEWARTS AND LLOYDS, LIMITED, Brook House, Upper Brook Street, London, W.1—A 42-page booklet, "Tollcross Steel Foundry," has a comprehensive description of the new £1,000,000 foundry at Tollcross, Glasgow, completed in 1954, and of the extensive range of its products. The foundry is "manned by personnel with many years of experience in all phases of foundry practice, ready to serve customers in the open market as well as providing for the needs of the company." The publication contains many excellent illustrations, including some in colour, and while a number of these are functional, others are of considerable artistic merit. There is a section setting out British Standard steel specifications and equivalents and another dealing with the company's special-purpose irons and steels.

BRITISH TRANSPORT COMMISSION, 222, Marylebone Road, London, N.W.1—The "Industrial Perspective" series in Transport Age (2s. 6d.) is one of the many interesting features of the magazine. North Lancashire and Cumberland are the areas covered in the July issue by Jossleyn Hennessy. Another regular feature, "People in Transport," this month spotlights Leonard Castleton, chief transport officer of the Metal Box Company, Limited, who is interviewed by George Scott. Metal Box has factories all over Britain dependent on supplies of tinplate from South Wales. He estimates that about 60 per cent. of the company's goods go by road and 40 per cent. by rail. "The railways are creeping back," he says. Readers of Transport Age are kept right up to date with the rail modernization projects; a feature on signalling is of special interest in this respect in the July number.

TEES-SIDE AND SOUTH WEST DURHAM CHAMBER OF COMMERCE, North Eastern Bank Chambers, Marton Road, Middlesbrough—Manufacture of specialized insulation for nuclear reactor vessels at the Stillington works, near Stockton-on-Tees, of Darchem Engineering, Limited, necessitates the use of a special dome-shaped air-conditioned building and special garments for employees to ensure perfectly clean conditions. Recently, the works delivered a big consignment of the stainless steel insulation to the Latina power station, Italy, by special train and in containers which were not opened until they reached the site. The safeguards to prevent entry of dust or dirt are necessary to avoid risk of radiation hazard once the reactors become active. News of many other industrial undertakings in the area is contained in the July issue of the Tees-side Journal of Commerce.

IMPERIAL CHEMICAL INDUSTRIES, LIMITED, Imperial Chemical House, Millbank, London, S.W.1—The top direction of ICI recently came in for a thorough overhaul. One of the two deputy chairmen primarily concerned with the reorganization was Mr. E. A. Bingen, and in the July issue of ICI Magazine he answers questions put to him by the editor (Sir Richard Keane). Interesting data are forthcoming from this "quiz on how a team of men sets about the job of directing a group whose turnover last year exceeded £558,000,000 and whose capital development has averaged over £45,000,000 a year in the last 10 years." Muscovites' reaction to the recent British Trade Fair in the Soviet capital—and to the ICI exhibits in particular—is described by Dennis P. Carey, who says: "Even 80 tons of ICI give-away literature did not satisfy the Russian thirst for information. There had to be a daily ration of ICI pamphlets—gone in a few minutes. Of all our products, 'Terylene' excited the greatest interest."

COLVILLES, LIMITED, 195, West George Street, Glasgow, C.2—It is 100 years since Richard Smith and Charles McLean went into partnership and took over a small galvanizing business at Mavisbank. Their capital was £5,000, contributed equally by the partners. Smith died four years later and McLean retired soon afterwards. Expansion of the business began when it changed hands following Smith's death. The new owner, George C. Jardine, brought in his cousin, Charles C. Mowbray, as junior partner in 1870 and proceeded to operate the business on a totally different scale. Although these two had the vision to see the possibilities in galvanizing, their works was not efficiently run and was, in fact, making a loss when the extraordinary association with the Yates family began. Now, in the centenary year, the Gartcosh Sheet Works is being reborn in the vast new undertaking of the cold-reduction sheet mill. The story of the company makes fascinating reading and is related in the summer number of Colvilles Magazine (3d.). It is one of several interesting features in that issue.

Applying Developments of General Industry to Coal

COAL-MINING engineers must be increasingly ready to apply the scientific and technical developments of general industry, said Mr. H. E. Collins, member for production, National Coal Board, and president elect of the Institution of Mining Engineers, speaking at the annual dinner of the IME in the Portland Building of the University of Nottingham on Wednesday of last week. Already the coal-mining industry was incorporating developments in electronics and nuclear physics, to mention the more exotic examples, he said.

Mr. Robert A. Moore, president of the institution, said that it was only right that the East Midlands Division of the NCB should be recognized for the important part it had to play in the national coal-mining industry. Other coal-mining engineers were proud of their efforts, but their pride was often mingled with envy when the rather more favourable conditions were considered.

By the end of 1961, he said, 70 per cent. of the output of the East Midlands should be won by mechanization, compared with a national figure of 50 per cent.

SAFETY IN COAL MINES

Report on South Western Division for 1960

MORE than half of the total of 85 persons killed in the South Western Division of the Mines Inspectorate in 1960 resulted from the explosion at Six Bells Colliery on June 28, when 45 persons lost their lives. The 1959 total was 58. At the end of 1960 there were 341 mines producing coal in the division, compared with 380 at the end of 1959, states Mr. C. Leigh (HM Divisional Inspector) in his annual report under the Mines and Quarries Act, 1954 (Stationery Office, price 2s. 6d.).

Of the number of mines in production, 140 were operated by the National Coal Board and 201 by private owners under licence from the board, a reduction of 37 compared with 1959. The board was also responsible for 26 mines used solely for pumping and ventilation purposes.

The total number of persons employed in coal mines at the end of the year was 84,755, a reduction of 9,649 compared with 1959. The total output of saleable coal was 19,537,447 tons compared with 21,191,525 tons in 1959. The saleable output of deep-mined anthracite fell by 18,439 tons to 2,464,230 tons. Total export of coal and coke was 1,314,821 tons, of which 743,937 tons was anthracite.

More Seriously Injured

There was an increase in the number of persons seriously injured from 318 in 1959 to 320 in 1960. The comparable averages for the previous three years were 71.1 killed and 308.8 seriously injured. When considered side by side with the reduced exposure to risk represented by the fall in the number of persons employed, the total of all casualties gives cause for great anxiety, states the Inspector. It is, he says, obvious that the great efforts in the cause of safety that were made during the year by so many representatives of all the interested parties must be redoubled if the number of casualties is to be sensibly reduced. Table 1 gives the numbers of persons killed or seriously injured at coal mines working under the Mines and Quarries Act, 1954, during the year 1960.

TABLE 1.—*Persons Killed or Seriously Injured at Coal Mines in the South Western Division During* 1960 *Compared with the Average for* 1957-1959.

Classification of accident.	Killed.		Seriously injured.	
	1960	Average 1957–59	1960	Average 1957–59
UNDERGROUND				
Falls of ground				
(a) Falls of roof at face	9	12·3	51	43·7
(b) Falls of face or side	1	2·0	30	34·0
(c) Other falls	8	12·7	41	36·7
Total falls	18	27·0	122	114·4
Haulage and transport	14	29·0	102	104·4
Other causes	51	10·4	45	52·7
Total underground	83	66·4	269	271·5
,, surface	2	5·3	51	37·3
Surface and underground ..	85	71·7	320	308·8

Accidents from falls of ground account for 18 persons killed, compared with 23 in 1959 and an average of 27.0 for the three years 1957-59. The number of persons seriously injured was 122, compared with 118 in 1959 and an average of 114.4. Seventeen persons were killed and 112 were seriously injured due to falls of ground at the working face. In 1959 the respective figures were 22 killed and 108 seriously injured and the comparable averages for the three years 1957-59 were 25.3 and 107.0.

On the actual line of the working face nine persons were killed by falls of roof and 51 were seriously injured. The investigations into these accidents reveal that six of the fatal accidents and 11 of the non-fatal accidents occurred due to falls from geologically disturbed ground. It is, says the Inspector, impossible to emphasize too strongly that such ground should be supported much more intensively than ground which is normal. He calls upon managers to be ever ready to review the support systems they have prescribed so as to take account of geological changes. The subordinate officials and workmen, who will often be the first to become aware of these changes, should take action to ensure that the support afforded is adequate and effective. Most of the other accidents in this category were the result of delay in setting supports or of reliance upon supports which has become unstable. Such accidents reflect badly upon the quality of the supervision of the subordinate officials and the standards of workmanship of the workmen.

Four persons were killed as a result of falls of ground in the roadhead area, compared with nine in 1959. Three persons were killed and eight persons were seriously injured by falls of roof at the waste edge. In 1959 two persons were killed and seven were seriously injured.

Ignitions of Firedamp

There were five ignitions of firedamp in which no fatality or serious injury occurred. Four occurred in safety lamp mines and one at the upper

end of a borehole drilled vertically to the surface from workings in a safety lamp mine. The ignition at the upper end of the borehole occurred when sandstone pebbles were struck by a navvy type pick. In two cases gas in the undercut was ignited. In one the means of ignition was the frictional sparks of the cutter picks rubbing on the uneven sandstone floor and in the other the igniting medium was a damaged trailing cable drawn into the undercut.

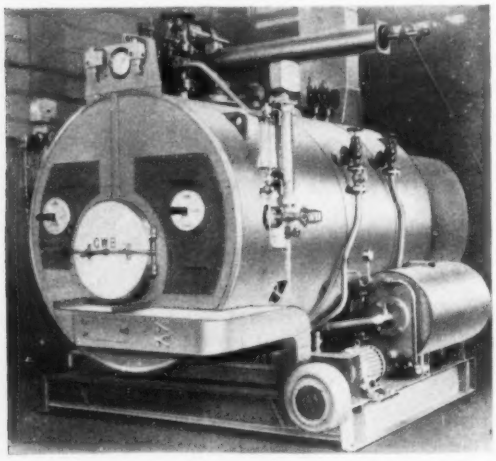
The fourth ignition occurred immediately following the firing of a round of two shots in the rippings of the intake roadhead of a single unit conveyor face. The explosive used was equivalent sheathed and the burning gas spread for some 15 yd. outbye along the roof of the roadway. Gas issuing from a pulsed infusion borehole in the coal face some 10 yd. away was also ignited. As a consequence of this ignition it was decided to inject all shotholes in rippings in that seam with a foam mixture before charging. The foam is contained in a small canister and introduced into the shotholes by a manually operated pump at a pressure of up to 45 lb./sq. in. One hole can be treated in less than a minute and the canister holds sufficient foam to treat 30 shotholes. Sampling before and after treatment has shown a reduction in the concentration of methane at the back of the shothole from 55 per cent. to 1.5 per cent. The results point to a definite reduction in the risks associated with shotfiring in rippings.

The number of horses employed at mines in the division at the end of 1960 was 1,121 a reduction of 207 compared with 1959. Of the total, 893 were employed at the NCB mines and 228 at licensed mines.

Solid Fuel Packaged Boiler

SPECIFICALLY designed for solid fuel firing, a new packaged boiler, the G.W.B. Vekos-Powermaster, is now being marketed by the boiler division of G.W.B. Furnaces, Limited, Dudley (Worcs). Delivered as a complete, compact, self-contained unit, the boiler is quickly and easily installed and requires no special foundations. It is claimed to give a consistent efficiency of more than 80 per cent. when burning a wide range of fuels, without the use of economizers or superheaters. Fuels tested have been strongly caking, free burning, low-ash content (as low as 3 per cent.), and high-ash types. The fuel sizes have ranged from small coal to singles.

The unit conforms to the requirements of the Clean Air Act and also to the recommendations of the Federation of British Industries that flue dust pollution should not exceed 0.2 grains/cu. ft. This is achieved by built-in multi-cell grit arresters.



THE G.W.B. VEKOS-POWERMASTER PACKAGED BOILER.

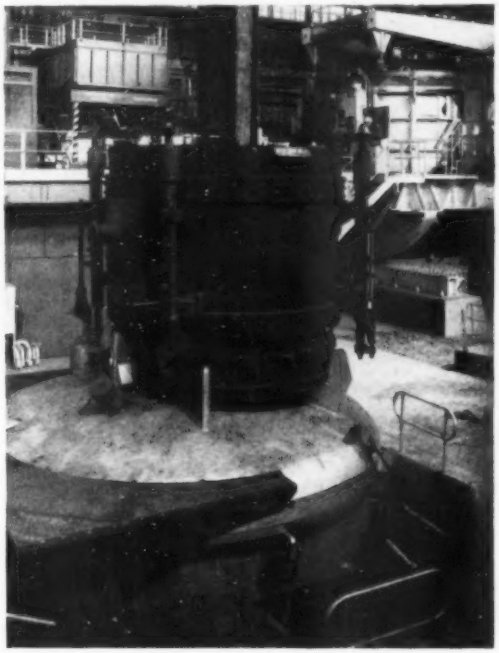
The unit is controlled by steam pressure or water temperature and is designed for operation within a firing range of 30 per cent. to 100 per cent. of load.

Fuel is fed automatically by means of a screw conveyor from bunkers, hoppers, or coal storage. It is fed through the crown of the boiler to a vortex chamber supplied with air from a forced draught fan, and the fuel is thereby distributed in an even pattern on the firing bed, the air also providing over-fire secondary combustion air. The forced draught fan not only provides the tertiary and secondary air, but also the under-grate primary air, all three air supplies being controlled by a simple damper arrangement.

There are no moving parts in the furnace and the minimum life of the grate is estimated at five years, even with the use of low ash-content fuels. The grate is of a "V" formation and composed of loose sections. Firebars are manufactured from 2 per cent. chrome iron. Under-fire air is delivered to the fuel bed through "swan-neck" air ports in the grate bars.

In the event of a power failure it is possible to fire the boiler by hand, in order to provide continuity of steam supply. The air for combustion would be induced by a natural draught and dampers are provided to bypass the multi-cell grit arresters so that pressure drop across the boiler would be reduced.

THE MINISTRY OF TRANSPORT has revised permissible stresses to permit the use of cold-worked steel in bridgeworks at stresses appropriately higher than those for mild steel.



The Casting Bay in the Electric Furnace Department at the River Don Works, Sheffield, showing Ladle in Position over the Vacuum Casting Tank.

ENGLISH STEEL DEVELOPMENTS AT SHEFFIELD

80-Ton Electric Furnace

DESIGNED for the production of special alloy steels for casting in vacuum, the largest electric arc melting furnace in the United Kingdom has been commissioned at the River Don Works of the English Steel Corporation, Limited. With a shell diameter of 21 ft. and an electrical rating of 20 MVA, the furnace is capable of melting an 80-ton charge in less than 3 hr.

The furnace has been designed and built by Birlec-Efco (Melting), Limited. Power is supplied to the furnace by a 20-MVA transformer of AEI manufacture which has a resistance transfer on-load tap change mechanism especially suitable for arc furnace duty. A 10 per cent. auxiliary reactor arranged for on-load switching is also provided to limit power surges during the initial melting down.

The main switch employed is an oil-circuit breaker, having a 750-MVA rupturing capacity, by A. Reyrolle & Company, Limited. Specially designed water-cooled low-voltage flexible cables are used to carry current from the transformer to the furnace. During the melting period this current is approximately 28,200 amp. per phase. The furnace transformer secondary delta is made on the electrode arms at the point of connection to the flexible cables. This arrangement is designed to give a minimum reactance and high furnace power factor, particularly when the electrode arms are displaced away from each other.

Each electrode arm is counterbalanced by means of four pneumatic cylinders, enabling relatively small motors to achieve rapid accelerations and high speeds with a minimum of inertia. These motors are of special design to operate with a well-proved AEI amplidyne electrode controller. The electrode diameter is 20 in.

The furnace shell incorporates a new feature in that it is split horizontally in two halves just above the slag line. The upper half is detachable to enable the side wall brickwork to be replaced in the shortest possible time. To accomplish this, a spare upper half, which has been previously bricked, can be lowered into position in a similar manner to the way an arc furnace roof is replaced in conventional practice.

The vacuum casting unit is of Bochumer Verein design. By combining charges of other furnaces with the charge of the 80-ton furnace it will be possible to vacuum cast ingots up to 180 tons in weight. Ingots so produced are extremely low in hydrogen content, and forgings made from them are particularly suitable for highly stressed forgings for the electrical, chemical, and general engineering industries.

The new overhead travelling crane serving the electric melting and vacuum casting department at the River Don Works is by Clyde Crane & Booth, Limited, Rodley, Leeds. It is equipped for handling the ladles from the electric furnace and has a capacity of 200 tons on the main hoist. The auxiliary hoist has an independent crab running between the main girders and is of 50 tons capacity.

The new furnace was commissioned by Lord

Knollys, chairman of Vickers, Limited, and the English Steel Corporation, Limited, on July 7 (IRON AND COAL, July 14, p. 61). On the same day, at Tinsley Park, Lord Knollys poured the first skip of concrete for part of the foundations of a new £26,000,000 steelworks scheduled to be in operation by the last quarter of 1962.

This is the largest works development ever undertaken within the Sheffield city boundaries, and it is only the first stage of a long-term development plan by the English Steel Corporation. Scheduled to be operating by the last quarter of 1962, it will include a melting shop with two 100-ton electric furnaces, a 42-in. blooming mill, a billet mill with two 32-in. stands, and bar mills. The new plant will increase English Steel's total capacity for the production of alloy and special carbon steels to about 1,000,000 tons a year, and billet and bar production will be trebled.

Second Cowans Sheldon Crane for Canada

EARLY last year, against stiff American competition, Cowans, Sheldon & Company, Limited, Carlisle, won a contract for two large diesel railroad wrecking cranes for the Quebec Cartier Mining Company. The larger crane, of 500,000 lb. lifting capacity, was designed, built, and tested in nine months and despatched to Canada last November. The crane was described and illustrated in our issue of November 25, 1960, p. 1173.

THE SECOND DIESEL-HYDRAULIC RAILROAD WRECKING CRANE DESIGNED AND BUILT FOR THE QUEBEC CARTIER MINING COMPANY IS DEMONSTRATED TO RAILWAY ENGINEERS, LIFTING A TEST LOAD OF 300,000 LB., BEFORE DESPATCH TO CANADA.

Like the larger, the smaller crane, of 300,000 lb. lifting capacity, is of diesel-hydraulic design, mounted upon a six-axle, double-bogie carriage. It is fitted with main and auxiliary hoists, for use on 4-ft. 8½-in. gauge tracks. Designed for arduous railroad wrecking service under Arctic conditions, with temperatures down to minus 60 deg. F., the crane will pass a rolling-structure gauge 15 ft. 3 in. high by 10 ft. 6 in. wide and will negotiate curves of 38 deg. for 150 ft. minimum radius.

The maximum axle-load when in running order, with jib suspended and blocks supported upon a matchtruck, is 50,000 lb., while the maximum lifting capacity, with outriggers set, is 300,000 lb. at 17 ft. 6 in. radius, on the main hook. This figure does not require deduction of the weight of the blocks and hook, and minimum reserve stability is 17 per cent. Length over headstocks is 36 ft. 1½ in., coupled length is 39 ft. 6 in., and axles are spaced at 5 ft. within the bogies.

Fitted with a Rolls-Royce six-cylinder, vertical liquid-cooled, normally aspirated diesel engine, rated at 179 b.h.p. at 1,800 r.p.m., the crane will lift 300,000 lb. at 6½ ft./min. and 112,000 lb. at 20 ft./min. on the auxiliary hoist. Lighter loads may be lifted on each hoist at automatically increased speeds up to twice the full-load speed with half the full load being lifted. The full load may be slewed through 360 deg. in 2 min. and the jib derricked in from running height to minimum radius in approximately 2 min.

Rated loads are derricked from maximum to minimum radius at 15 ft./min., while the crane will travel with a load of 56,000 lb. upon the hook up a straight 2½ per cent. grade, at 130 ft./min., or, on the level, at 260 ft./min.

Record US Scrap Exports

DOMESTIC use of iron and steel scrap for all purposes in the United States during 1960 rose slightly over 1959, but pig-iron consumption rose to a greater extent, reflecting the trend to use more pig-iron in relation to scrap, which is a feature of metallurgical practice in most steel-producing countries.

Scrap consumption in 1960 was 66,468,708 short tons (66,061,516 in 1959), while pig-iron consumption rose to 66,626,336 (from 61,773,191) short tons.

Amounting to only 179,457 short tons, imports of ferrous scrap (including tinplate) into the US in 1960 dropped 42 per cent. in quantity and 45 per cent. in value compared with the previous year.

On the other hand, the total of ferrous scrap exported during 1960—7,062,986 short tons—was the largest on record, showing a 46 per cent. increase in quantity and a 44 per cent. increase in value of 1959.

USE OF NATURAL GAS IN BLAST FURNACES

Recent Experiments in Texas

PRIOR to 1959 very little had been accomplished in the US steel industry toward the use of hydrocarbon fuel in the blast furnace. Since that time, however, activity has been stimulated by experimental work completed by the US Bureau of Mines at Bruceton, Pa. Lone Star Steel Company was one of the first steel concerns in the United States to use natural gas injection in a full-scale furnace. Its use there has been continuous since November 23, 1959.

The subject is dealt with by J. C. Moreland in a paper presented to Western States Blastfurnace and Coke Oven Association, Chicago, recently, and published in Blast Furnace and Steel Plant, April, 1961.

The blast furnace has 18 tuyeres, a 27-ft. hearth, and a working volume of 44,300 cu. ft. It operates with a burden of East Texas ores consisting of calcined limonite, calcined siderite, and sinter. The burden is unsized. Because of this and the relatively high silica content of the ores, the furnace normally operates with high coke and high limestone rates, producing a large volume of slag. The wind volume is 89,000 cu. ft./min. The open-hearth hot metal produced averages: Si, 1.25 per cent., and S, 0.030 per cent.

Method of Injection

Regarding method of injection, consideration was given to injecting the gas through auxiliary tuyeres, through ports made in existing tuyeres, and into the blowpipes. It was eventually decided that the most simple, least expensive and straightforward method would be to inject gas directly into the blowpipe. An advantage was that it would require practically no down-time. In fact, only seven days elapsed from taking the decision and the commencement of gas injection. A further advantage was that injection in the blowpipe involved no complicated controls.

In the course of a summary, the author points out that when the gas is injected, it combines with O_2 in partial combustion to $CO+H_2$. This consumes O_2 that would normally burn coke. Because of this, the coke rate was reduced 12 hr. prior to gas injection to prevent an excess of carbon at the tuyeres. Heat is required to dissociate the hydrocarbons in natural gas, as well as to raise the gas temperature to that of coke inside the furnace. To maintain thermodynamic equilibrium, approximately 60 deg. C. increase in hot-blast temperature was required for a gas volume injected equivalent to 1 per cent. of the blast. Natural gas injection improved furnace operation, raised efficiency and lowered thermal requirements per ton of hot metal. It had similar effects as steam on the driving rate, but reduced coke consumption. The limiting factor in reducing the coke rate and increasing production has been the available blast heat. Graphs indicate that with 3 per cent. gas injection, and a blast temperature of about 700 deg. C., the coke rate was lowered to 1,620 lb./ton, hot metal, and production increased to 1,380 ton/day. Fuel costs were reduced by 17 per cent. and operational costs by 15 per cent. Gas injection in the furnace has now been continuous since November, 1959, and based on the encouraging results, its use will be continued.

Large Acid Open-hearth Furnace for Swedish Works

THE SKF Hofors Works, in Central Sweden, has embarked on a major expansion programme which will call for investments of the order of £5,170,000 and which will include the installation of an acid open-hearth furnace with an annual capacity of 90,000 tons, the largest of its kind in Sweden. The new furnace will raise the works' output of crude steel to 290,000 tons a year.

The works has until now had eight minor open-hearth furnaces in operation, and the acid process has been chosen for this new one, which is to produce ball-bearing steel.

Further extensions under this programme include a new soaking pit for the ingot rolling mill, and a tube mill, due to become operative this autumn, with an annual capacity of 100,000 tons.

RUMANIAN OUTPUT FIGURES FOR 1960

THE cryptic "percentages" with which Ministerial announcement have tended hitherto to mask the actual facts of output in the Rumanian People's Republic, in which the outside world is interested, have at last been converted into concrete figures by the Bucharest Chamber of Commerce, in its Information Bulletin.

The figures given below are in respect of 1960, the percentage as compared with 1959 being given in parentheses. Coal, 8,163,000 tons (102); metallurgical coke, 820,000 tons (135); iron ore, 1,460,000 tons (137); pig-iron, 1,014,000 tons (120); steel, 1,806,000 tons (127); rolled steel products (tubes excluded), 1,255,000 tons (153); steel pipes, 338,000 tons (123).

Industrial Relations and the Mine Manager

BECAUSE of the fact that human effort played a major part in the mining industry, it was not surprising that a large part of a manager's thoughts and time was taken up with industrial relations, said Mr. W. B. Stewart, group manager of the Niddrie Group, Lothians Area, Scottish Divisional Coal Board, in his presidential address to the Scottish Branch of the National Association of Colliery Managers on May 17.

Since vesting date, the improvement in wages paid to workmen in most instances had been outstanding. In the Scottish Division, the application of seam agreements to contract work had cut away most of the cause for disagreements on conventional systems of working. Most of the difficulty in contract work appeared to revolve round the day-to-day deficiencies payable. That could well be a case for investigation by the management team and guidance for the controlling official. On power-loading agreements the possibility of variation on payments except for discomfort allowance was non-existent. In some ways that was all to the good, though the idea of incentive bonuses to workmen and officials was not without its advocates. As mechanization at the face increased one would be entitled to expect that day-to-day wages disputes should get less and less.

Disseminating Information

Mr. Stewart could foresee in the near future wages and conciliation matters being delegated by that manager to a member of the colliery administration team. That might not call for less thought on the manager's part, but he was certain it would take up much less of his time.

Discussions among the management teams were vitally necessary in the managing of a colliery. Discussions with heads of departments were only the start of the consultative function, and steps should be taken by each department to see that information was passed both down the line to, and up the line from, the personnel involved. In many collieries, consultative committees were working enthusiastically and doing an excellent service to the industry. The workmen took a keen interest in all the plans for the colliery. The team spirit which was engendered was shown in the working of the pit. Every encouragement should be given by management to these committees.

Preparation of coal for the market was now one of the most important functions of production, Mr. Stewart continued. Where coal preparation was done on the colliery premises it was essential to ensure the elimination of foreign material and to maintain a constant standard of product in the washed sizes.

Where different grades of coal were being wound from the same shafts, arrangements to maintain a constant blend in washed coal were necessary. If tub or mine-car standage was not available to ensure blending, auxiliary accommodation for unwashed dross on the surface would appear to be the most likely solution to deal with the problem.

Where outputs were handled at a central washery, control of blending must be placed, through the washery manager, on a responsible person. Management at colliery level could help considerably in maintaining standard blending by eliminating, where possible, cutting in clay and the filling of foreign material with coal.

It was a matter of pride to everyone in management to see the efforts that were being made to influence the public to use coal. The campaign could only be sure of success if management could ensure a constant standard of product.

He could foresee that planning for the future might require faces producing coals suitable for the winter season being made standbye for the summer, and other seams worked. That would need a greater emphasis on forward planning, especially on manpower and plant assessments.

COAL DISTRIBUTION IN INDIA

SEVERAL measures to improve coal supplies to areas distantly situated from the Bengal-Bihar coalfields, which produce about 80 per cent. of the total output of coal in India, have been adopted by the Government of India. States situated to the north of Mughalsarai, such as Uttar Pradesh, Delhi, Rajasthan, and the Punjab, are served by these coalfields. The total goods traffic in this direction is at present about 2,600 wagons per day, of which coal comprises about 1,900 wagons.

The railways aim to step up the movement of coal by up to 200 wagons a day, while more coal is to be moved by coastal shipping. At present about 1,000,000 tons of coal are moved annually from the port of Calcutta to the coastal States in the south of India. This movement will be stepped up progressively to about 2,000,000 tons and coal will now be carried to the ports of the western coast, such as Cochin, Bombay, and Saurashtra.

The movement of coal by sea is comparatively costly and subsidies have been introduced. To meet this expenditure a cess of 80 naye paise per ton has been levied on all coal despatched from collieries —this being additional to the existing cess of 88 naye paise per ton.

Data Sheets on Tube Products

A new series of data sheets describing the company's range of small-bore tubes and tube products has been issued by Johnson, Matthey & Company, Limited. Tubes to fine limits are available principally in non-ferrous metals and alloys, although grades of nickel-iron alloy are supplied, as well as tubes in precious metals for specialized applications. The data sheets describe Johnson Matthey tubes in terms of end uses, for example, Bourdon tube, capillary tube, restrictor tube, instrument pointer tube, tube for applications in electronics, and miscellaneous base-metal tubes. The sheets are available from the company at 73-83, Hatton Garden, London, E.C.1.

Miners' Knee Pad

A MINERS' knee pad has been designed by Dr. W. J. Sharrard to cushion the effects of pressure in kneeling and to prevent discomfort to the wearer from dirt or grit collecting under the pad. Fig. 1 shows a perspective view of the pad, and a transverse cross-sectional view. The knee pad comprises an outer casing of moulded hard rubber and an inner lining of sponge rubber. The outer casing includes a base portion provided on its bottom face with a number of hemispherical projections.

The side portion tapers towards the base, at the front of which is the upstanding portion. This makes an angle of 95 deg. with the base, which tapers rearwards at an angle of 5 deg. Straps are attached through the slots in the sides of the knee pad.

Casing and lining are welded and the edge of the lining is provided on its face with ridges which project towards the casing. The ridges are arranged to provide between them channels which form a herring-bone pattern. Extending through the lining are apertures which communicate with the channels.

Any dirt or grit which comes between the knee and the knee pad will fall through the apertures into the channels. As the wearer moves around, this dirt or grit will be worked along the channels to be discharged at the rear end of the pad.

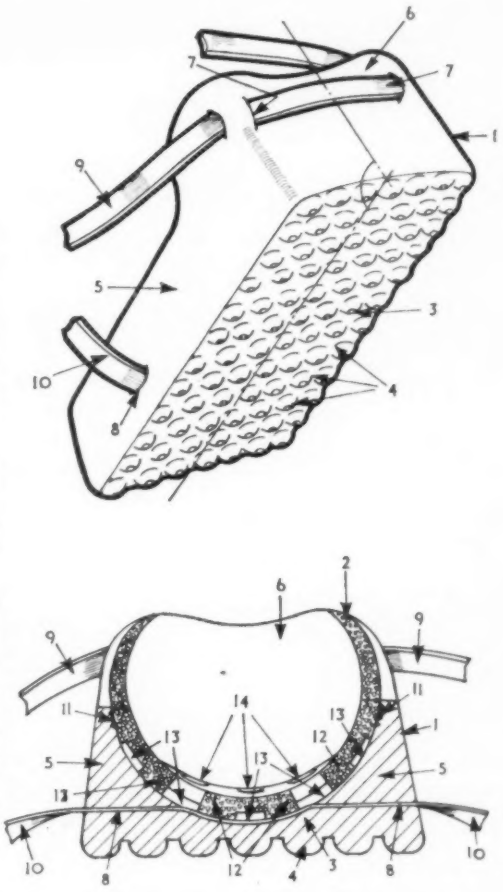


FIG. 1.—PERSPECTIVE VIEW AND TRANSVERSE CROSS-SECTIONAL VIEW OF THE NEWLY DESIGNED KNEE PAD. THE NUMBERS REFER TO:—

1.—Outer casing. 2.—Inner lining. 3.—Base portion. 4.—Hemispherical projections. 5.—Side portion. 6.—Upstanding portion. 7 and 8.—Slots for straps. 9 and 10.—Straps. 11.—Welded joint between casing and lining. 12.—Internal ridges. 13.—Channels. 14.—Apertures extending through the lining.

UNDERGROUND FIRES IN INDIAN COAL MINES

UNDERGROUND fires in the Jharia coalfields in India are rapidly advancing, according to Mr. L. N. Jha, Deputy Information Minister of Bihar State. Mr. Jha said there was considerable danger of subsidence in Jharia town and its neighbouring areas. In the main blocks of the Pure Jharia and Jogta collieries fires were raging in 36 collieries which were destroying the finest reserves of metallurgical coal in India.

Mr. Jha regretted that there was some difference of opinion between the experts of the Government of India and the Bihar Government over the gravity of the situation. While the Government of India experts appeared to be minimizing it, the people of the locality and the experts of the collieries and the Government of Bihar considered it to be very grave, he said. Mr. Jha said that some big collieries were undertaking stowing operations on their own as a preventive measure, but owners of small collieries, unable to meet the cost involved, were abandoning the mines.

WORK ON Indonesia's first steelworks will begin this year at Merak, in Java. Planned by Soviet engineers, it will have an output of 100,000 tons a year, and will be equipped with Russian machinery.

A PAPER ON "A Marine Geophysical Survey of the Undersea Coalfields of Northumberland, Cumberland, and Durham," by R. Allonby, M. Clarke, and D. Magraw, will be presented at a general meeting of members of the North of England Institute of Mining and Mechanical Engineers on August 10. The meeting, to be held in the Lecture Theatre of the institute, Neville Hall, Newcastle-upon-Tyne 1, will begin at 2.30 p.m.

PIG-IRON AND STEEL PRODUCTION

IN the following United Kingdom pig-iron and steel statistics, issued jointly by the Iron and Steel Board and the British Iron and Steel Federation, Table 1 gives the production of pig-iron and ferro-alloys and the number of furnaces in blast in May. Table 2 gives the production of steel ingots and castings in May and Table 3 gives details of finished steel in April. Activities of the industry are summarized in Table 4.

TABLE 1.—*Weekly Average Production of Pig-iron and Ferro-alloys in May*, 1961. (*Thousands of Tons.*)

District.	Furnaces in blast.	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.
Derbys, Leics, Notts, Northants, and Essex	20	—	27.6	19.4	—	47.0
Lancs (excl. N.-W. Coast), Denbighs, Flints, and Ches	8	—	22.3	—	2.5	24.8
Yorkshire (excl. N.-E. Coast and Sheffield)	—	—	—	—	—	—
Lincolnshire	10	—	46.4	—	—	46.4
North-East Coast	16	2.3	60.1	—	—	62.4
Scotland	7	1.9	24.1	1.3	—	27.3
Staffs, Shrops, Worcs, and Warwicks	5	—	9.2	1.0	—	10.2
South Wales and Monmouthshire	10	3.6	56.7	0.3	—	60.6
Sheffield	2	—	3.2	—	—	3.2
North-West Coast	7	15.6	—	1.3	1.4	18.3
Total	85	23.4	249.6	23.3	3.9	300.2
April, 1961	86	21.3	259.6	24.3	3.2	308.4
May, 1960	85	22.0	245.7	26.8	4.6	299.1

TABLE 3.—*Weekly Average Deliveries of New Non-alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1959.	1960.	1960.	1961.	
			April.	March.*	April.
Non-alloy Steel:					
Ingots, blooms, billets, and slabs‡	5.1	5.6	5.8	6.8	6.9
Heavy rails	6.8	8.7	9.3	9.2	8.7
Sleepers	0.6	0.8	0.5	1.0	1.2
Fishplates and soleplates	0.4	0.6	0.7	0.7	0.4
Plates, 3 mm. thick and over:					
(i) Over ⅜ in. thick	24.8	30.9	31.3	39.0	40.1
(ii) Under ⅜ in.	18.3	22.0	23.9	24.3	25.8
Other heavy prods.	41.2	53.1	56.5	60.3	57.7
Ferro-concrete bars	9.6	12.0	10.2	14.6	13.0
Wire rods	23.5	28.6	29.8	27.7	26.3
Arches, etc.	7.8	7.9	8.6	7.4	8.2
Other light sections	33.0	41.3	41.8	40.8	41.9
Bright steel bars	7.6	9.7	10.0	9.5	9.4
Hot-rolled strip	27.4	33.1	33.8	28.2	27.7
Cold-rolled strip	8.0	10.0	9.8	9.1	8.8
Sheets, incl. coated:					
(i) Hot rolled	11.8	12.9	13.5	11.2	11.1
(ii) Cold reduced	35.2	40.6	40.2	37.8	36.9
Tinplate:					
(i) Hot dipped	7.7	8.0	9.2	5.8	5.9
(ii) Electrolytic	13.2	14.4	15.2	15.2	12.9
Blackplate	0.7	0.9	0.8	0.7	0.7
Tubes up to 16 in.	20.6	23.8	24.1	22.6	24.2
Tube fittings, etc.	0.4	0.4	0.4	0.4	0.4
Tyres, wheels, and axles	2.4	2.4	2.3	2.3	1.7
Forgings (excl. drop)	2.1	2.2	2.2	2.2	2.6
Steel castings	3.6	4.3	4.0	4.8	4.3
Tool steel	0.2	0.2	0.2	0.3	0.2
Total	312.0	374.4	384.1	381.9	377.0
Alloy Steel	18.2	22.5	22.7	23.1	23.6
Total deliveries from UK prod.†	330.2	396.9	406.8	405.0	400.6
Add: Imported finished steel	7.1	19.1	23.1	5.8	5.8
	337.3	416.0	429.9	410.8	406.4
Deduct: Intra-industry conversion§	47.6	56.4	62.3	53.9	52.4
Total new material	289.7	359.6	367.6	356.9	354.0

† Includes finished steel made from imported ingots and semis.
‡ Other than for conversion into any other form of steel listed.
§ Material for conversion into other products also listed in this table.

TABLE 2.—*Weekly Average Production of Steel Ingots and Castings in May*, 1961. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer and L.D.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Steel for castings.	
Derbys, Leics, Notts, Northants, and Essex	—	3.9	15.4 (basic)	2.5	0.1	20.6	1.3	21.9
Lancs (excl. N.-W. Coast), Denbighs, Flints, and Ches	1.4	38.3	—	5.4	0.3	44.0	1.4	44.1
Yorkshire (excl. N.-E. Coast and Sheffield)								1.3
Lincolnshire	—	53.4	—	—	0.1	53.4	0.1	53.5
North-East Coast	0.8	93.4	—	1.7	0.4	94.2	2.1	96.3
Scotland	0.9	47.4	—	4.1	—	50.1	2.3	52.4
Staffs, Shrops, Worcs, and Warwicks	—	24.0	—	5.0	0.7	27.9	1.8	29.7
South Wales and Monmouthshire	1.4	83.8	18.1 (basic)	0.7	0.1	103.6	0.5	104.1
Sheffield (incl. small tonnage in Manchester)	7.9	35.0	—	14.1	0.3	55.4	1.9	57.3
North-West Coast	—	—	4.7 (acid)	0.8	—	5.4	0.1	5.5
Total	12.4	379.2	38.2	34.3	2.0	454.6	11.5	466.1
April, 1961	11.8	384.9	39.7	33.1	2.1	460.1	11.5	471.6
May, 1960	14.7	385.2	38.9	34.4	2.2	463.6	11.8	475.4

TABLE 4.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	B.o.T. Price Index 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.††	Basic materials§						Imports.†	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.‡
1959	340	496	477	286	244	210	242	208	7	388	291	2,244
1960	339	505	482	329	319	264	303	243	24	467	361	2,702
1961—Feb.	339	538	476	354	325	265	302	254	11	485	365	2,783
Mar.*	339	538	480	351	322	264	313	248	11	471	358	2,779
April	339	538	480	313	322	261	308	244	6	472	355	2,745
May	339	520	482	333	304	254	300	244	5	466	343	2,774

Months contain five weeks, all tables.
† Weekly average of calendar month.
‡ Stocks, ingots, semi-finished and finished steel, at the end of the years and months shown.
†† The index for coal is now based on prices ruling on the last day of each month.
§ Used in non-food manufacturing industries.

IRON AND STEEL TRADE

HOLIDAYS have begun and will progressively affect both producers and consumers during the next month or so. Confidence that the reduced demand for most products would be replaced by an upward trend after the holidays has been shaken by the Chancellor's action this week in imposing a new credit squeeze. Whether improvement develops to the extent of bringing back into operation the furnaces now closed or restoring full-time working at the rolling mills depends very largely on how the home market is influenced by spending on capital projects and a wide range of consumer goods.

The heavy side of the industry is being hit by the tendency of consumers and merchants to limit their orders for structural steel and plate, but it noted that the work booked by civil engineering and contracting firms increased during the first quarter of the year and a good many of the schemes are in the pipeline to start or to be completed during the next year or so. The overall commitments of the engineering concerns have also grown through the increasing orders for industrial plant and equipment and these signs of promised and prolonged activity in major steel consuming industries augur well.

In other respects the immediate outlook is not so good. There are no signs of any real improvement in the shipyards, while a marked drop in the oversea demand for large-diameter steel tubes for oil pipelines and other projects is reflected (in some firms more than others) in reduced activities at the plate mills and in the lower outputs of steel ingots and pig-iron required as a consequence.

Pig-iron

From now on annual holidays will curtail production at the iron foundries, but interruptions in deliveries of castings are unlikely to embarrass consumers, many of whom will themselves be on holiday. Most of the foundries would welcome orders The light foundries want more business, and the engineering and speciality foundries are now less busy than they were. Demands for high-duty castings from the motor industry may fall off still more as the result of the credit restrictions.

Ferro-alloys

Conditions are quieter, no doubt due to holiday influences, but there is nevertheless a fairly reasonable demand for most items.

Ferro-silicon and ferro-chrome continue to attract steady support, and calcium silicide is quite active. The more specialized demand for ferro-phosphorus and ferro-sulphide is at quite a good level, and ferro-manganese is of fair interest.

The call for ferro-molybdenum and ferro-vanadium has slackened, and ferro-tungsten shows no improvement. Ferro-niobium also is quieter than of late, but there is a fair demand for ferro-titanium.

Semi-finished Steel

Most of the rerollers will be closed during August for their fortnight's annual holiday. Business for most of their products shows little improvement, and difficulty is experienced in keeping the mills occupied at the present rate of production. Orders arising for small bars, light sections, strip, and bright drawn bars are readily completed, and there is little forward buying, with the result that order books are confined generally to a few days' production. The rerollers are well provided with steel semis, and prompt deliveries of most grades of billets, etc., can be obtained.

Finished Steel

Trade in sections and joists during the last three months has been meagre, and with the industrial holidays almost upon us orders from consumers to the steelworks will be at a reduced rate. The steelworks have plenty of room for new orders, as most of them have now taken up their backlogs and are anxious to have additional tonnage either for early rolling or for a deferred period. Gradually, the plate mills have worked off their earlier commitments, and with increased outputs possible would welcome additional business, but trade is at a low ebb for home and export accounts and there has been a paucity of business of late from the big consumers in the shipbuilding industry.

Makers of coil, rods and sheets are also anxious for business, as the demand from the motor industry is not up to the proportions of a few months ago. It it hoped that early autumn will show a revival of demand. Makers of cold-rolled and hot-rolled strip are short of orders and would welcome additional lines.

The general engineering trade is taking up somewhat better tonnages of special alloy, high-carbon and bright steels, and the makers of these should have considerable business ahead of them when they resume work after the holidays. There is no change in the position affecting steel for colliery requirements. The makers of arches, props, rails, and roofing bars are not fully occupied, owing to the reduced NCB requirements.

CHANGES IN SPECIAL-STEEL PRICES

FOLLOWING the substantial rise in the cost of nickel, increases have been made in the maximum prices of most nickel-bearing alloy and stainless steels. Adjustments have also been made for the higher cost of vanadium for those few steel products containing this alloy.

It has been found possible in the light of experience at modern plant to make some adjustments in the width and gauge extras for stainless steel cold-rolled strip; the most significant of these result in price reductions in the thinner sizes.

The changes, which come into force on Monday, July 31, have no significant effect on the overall level of steel prices.

[The Mond Nickel Company increased the price of nickel from £600 to £660 per ton on June 30. The price had remained at £600 from December, 1956.]

Coalfield News

Northumberland Miners Praised by Lord Robens

NORTHUMBERLAND miners were congratulated by Lord Robens, chairman of the National Coal Board, for their rise in productivity this year. In the first 27 weeks of 1961, he said, output had risen by 6 cwt. at the face compared with last year, and overall productivity was up 2 cwt. a shift.

Lord Robens, who was speaking at the annual luncheon of Blyth Harbour Commissioners, added: "If this rise applied to the rest of the British coalfield, the industry would be home and dry."

WITH A GROSS total output of 8,810 tons in one day, the 12 collieries in the No. 1 (Swansea) Area of the South-Western Divisional Coal Board set up a record last Friday. This was the highest daily output figure since the Area was formed in 1950.

GILMERTON COLLIERY, near Edinburgh, which employs 300 men, was closed on July 18 as a precautionary measure, after a routine air check disclosed slight heating in the oil section. The heating was later stopped and work resumed with the night shift the same day.

AUGUST ISSUE of "Mining Review", the National Coal Board newsreel, shows aspects of the work carried out at the NCB Central Engineering Establishment at Bretby (Staffs), and the bringing into operation of the Bretby tunnelling machine. Lighter items deal with bell ringing and clog dancing.

FOR THE BENEFIT of the dependants of the four men who lost their lives in the Cortonwood Colliery disaster, the Monk Bretton branch of the National Union of Mineworkers has made a grant of £50 to the fund raised by Mr. J. Rose, chairman of the Wombwell Urban Council. The fund now totals £90.

REVIVED AFTER a break of three years, more than 170 miners recently took part in the North Staffordshire Area fire fighting competition. The team championship was won by Victoria Colliery (Stoke) from Stafford Colliery and Norton Colliery. Mr. H. J. Widdowson, Area general manager, presented the awards.

A DECISION by the planning authority to refuse permission for the extraction of coal by open-cast methods from a 10½-acre site at Denby (Derbyshire) is to be contested by Derbyshire Mining (Ripley), Limited, Somercotes. A local inquiry will be held by the Minister of Housing and Local Government on July 27.

IN A NEW block of buildings recently criticized as being too contemporary to be a neighbour of Wakefield Cathedral, the National Coal Board is to have a showroom for the promotion of the sale of coal and coal-burning appliances, similar to one recently opened at Sheffield. The existing showroom in Kirkgate, Wakefield, will be closed down.

OVERALL PRODUCTIVITY in the Durham Division of the NCB in the first 28 weeks of the year averaged 23.14 cwt. per manshift compared with 22.11 cwt. in the same period of 1960. At the face, productivity reached 65.97 cwt. (64.71 cwt). In the 28th week, overall productivity was 22.71 cwt. (22.15 cwt.) with 64.03 cwt. (65.5 cwt.) at the face.

SHIPMENTS OF COAL and coke from the South Wales ports last week were on a better scale and reached 62,365 tons. They were 19,826 tons more than in the previous week, when, however, heavy weather was responsible for some slowing in deliveries. Last week's shipments were more than 22,000 tons heavier than in the corresponding period of 1960.

ALMOST £7,000 had been collected towards the £10,000 appeal fund launched for the 10-year-old miners' rest home at Porthcawl, said Mr. Gwyn Phillips, chairman of the home's board of management. Mr. A. H. Kellett, chairman of the South-Western Division of the NCB, is to be invited to switch on the new heating system at the home in September.

ALTHOUGH OPPOSED in general to open-cast coal working in its area, Llandeilo Rural Council last Saturday agreed to defer a final decision on its attitude for open-cast mining at Penybank, near Ammanford. The site, Blaina Deep, contains a larger reserve of anthracite coal than any other site which the National Coal Board proposes working in Carmarthenshire.

WITH THE RETIREMENT of Mr. Jonathan Stoddart from Medomsley Colliery (Co. Durham), after 52 years' service, the family link with the pit since it was opened 120 years ago has been broken. Mr. Stoddart's grandfather helped to sink the pit and worked there until he retired. Mr. Stoddart's father began work at the colliery when he was 13 and served for 43 years before he died.

TWO BROTHERS, members of a mining family which has been associated with Grimethorpe Colliery, near Barnsley, since its sinking 67 years ago, have retired together. They are Mr. Colin Reed, foreman blacksmith for 25 years, and Mr. Frank Reed, who was on the electrical staff of the colliery until he became foreman of the motor repair department of the Carlton Area central workshops three years ago. Both received retiring gifts.

Coal Deposits Found in Oxfordshire

COAL deposits have been found near Witney, 12 miles from Oxford, by the Geological Survey and are described as "promising." Samples are being analysed by the National Coal Board and results so far are considered to justify further exploration of the area. The samples have been found at Apley Barn on the outskirts of Witney in the valley of the river Windrush.

A statement issued by the Department of Scientific and Industrial Research on Thursday of last week said: "In August, 1960, the Geological Survey of the department began drilling at Apley Barn, Witney, in the Great Oolite of the Jurassic System and passed into rocks of the Triassic System. Below the provisional base of the Triassic System at about 820 ft., reddened sandstones were encountered, which gave place first to reddened and then to grey mudstones containing plants and crustacea of the Upper Coal Measures Age.

"A number of thin coal seams were penetrated between 1,005 and 1,928 ft., including a 3 ft. seam at 1,661 ft. At the end of the year the depth was 1,928 ft. and coring is continuing and has now reached a depth over 4,500 ft."

The statement adds that between the depth of 1,928 ft. and the present depth the coals have been found at several horizons, including some of thicknesses exceeding 2 ft. 6 in. It is hoped to continue boring to establish whether productive (middle coal) measures will be found. In the meantime the National Coal Board is analysing coals already drilled. The results obtained so far are sufficiently promising to justify further exploration in the area, it is stated.

THE COAL TRADE

IMPROVED demand for household coal in a number of areas recently has been maintained, and as well as small orders for current consumption merchants report that they are now receiving some larger orders for stocking, with most qualities readily obtainable. The coke market continues quiet with only small domestic demand, while the interest in industrial coals is affected by the annual holidays, although a number of concerns are now showing greater interest in building up winter reserves.

LEICESTERSHIRE

Because of colliery holidays supplies into depots are suffering as regards quality and many substitutions are taking place where coal is urgently needed. Orders continue to be placed with distributors at a fair rate, but it is noticeable that delivery is requested later in the autumn. Supplies of all grades of best coal remain exceptionally scarce and most distributors are quoting many week's delivery for best selected qualities. There is little market at the moment for the trolley section of trade.

It is noticed in the district that distributors are now putting into stock considerable tonnages of house coal and it appears that some substantial tonnages will be available later in the year. The position with regard to all types of best grade anthracite shows no improvement and despatches by rail are subject to considerable delay. Distributors generally are holding orders for considerable tonnages and in some cases now are being compelled to deliver small quantities to alleviate the position.

The steady demand for all grades of smokeless fuel continues but supplies of Coalite and Rexco are extremely scarce and despatches by road and rail are far from prompt. Cleanglow has shown some improvement and some fair tonnages have been moved in recent weeks. All sizes of domestic cokes are in fair supply and there appears to be sufficient tonnage available for all needs. There are some qualities of coal now being offered outside programme, but these are mostly of middle grades—unpopular at the present time.

There is no improvement in the coke market for central heating. Apart from tonnages now being delivered to service and public utility undertakings and ordered earlier in the year, there is little tonnage moving at present. The industrial market continues firm but there is little change in the general position. Supplies of doubles, D.S. nuts and singles continue to be available and despatches by collieries in the Leicestershire and South Derbyshire Area are prompt and roadborne traffic is loaded without difficulty.

"Dust Allowances" for Miners Need Extending

WHEN a miner complained of "a touch of the dust" it was usually assumed that he had pneumoconiosis or silicosis, but in the experience of Dr. K. T. Wallace, North Wales Area medical officer of the National Coal Board, his short breaths are more likely to be caused by bronchitis or heart disease.

He told a conference on the resettlement of the disabled in Liverpool last week that these "chesty" miners were more of a problem than many cases of pneumoconiosis, and the "dust allowance" paid in compensation for this disease and silicosis should be extended to chronic bronchitis.

Pit Holidays Reduce Coal Output

PIT holidays reduced total saleable coal output from mines and opencast sites last week to 3,367,400 tons compared with 3,469,000 tons in the previous week. Total production for the year to July 22 was nearly 107,600,000 tons compared with 111,600,000 tons over the comparable period last year. Total consumption during the week ended July 15 was just over 3,100,000 tons, representing a drop of 27,000 tons on that during the previous week. Undistributed stocks rose marginally and now total nearly 23,000,000 tons.

There were 566,640 wage-earners on colliery books on July 15, against 596,520 on July 16, 1960, the numbers engaged at the coal face being 212,670 and 227,620 respectively. Total absenteeism (all workers) in the week ended July 15 was 15.07 per cent., compared with 15.14 per cent. in the week ended July 16, 1960. Output at the face was 4,218 tons and overall 1,438 tons in the week ended July 15, compared with 4,093 and 1,413 tons in the week ended July 16, 1960.

The following table gives (in tons) the provisional figures of output of saleable mined coal by division in the week ended July 22, and the tonnage lost through disputes:—

Division.	Week ended July 22, 1961.		Week ended July 23 1960.
	Total output.	Tonnage lost.	Total output.
Scottish	88,000	267,000	86,000
Northern (N&C) ..	238,000	—	166,000
Durham	458,000	—	348,000
North-Eastern ..	802,000	29,000	703,000
North-Western ..	186,000	33,000	214,000
East Midlands ..	816,000	82,000	639,000
West Midlands ..	293,000	—	265,000
South-Western ..	265,000	107,000	241,000
South-Eastern ..	30,000	—	27,000
Great Britain—			
Deep-mined coal ..	3,176,000	518,000	2,689,000
Open-cast coal ..	156,000	—	154,000
Other deep-mined (including licensed mines) ..	35,000	—	40,000
TOTAL ..	3,367,000	518,000	2,883,000

DISPLAY of coal and ash handling equipment is to be held by the Combustion Engineering Association at the British Railway Goods Yard, Salford (Lancs), from September 19-21. Equipment on show will include stokers and ash excavators, elevators and conveyors, mechanical shovels and grabs, and coal bagging plant. The association is also holding a one-day conference on October 19 in Leeds.

Law Cases

Black-Clawson Loses Appeal Against Worker's Award

APPEAL by Black-Clawson International, Limited, paper mill machinery engineers, of Newport (Mon) against an award of £1,329 damages to Mr. Erling Frederick Brustad (30), for injuries suffered at the company's foundry, was dismissed by the Court of Appeal. The firm appealed on the grounds that the award, made in November, 1960, was excessive.

Mr. Brustad received the damages for burns he received while working at the foundry as a moulder in 1958. Lord Justice Sellars said that although the award was on the high side, it was not as high as to justify interference. Lords Justices Devlin and Danckwerts agreed. The appeal was dismissed with costs.

£5,500 AWARD TO MINER

DAMAGES of £5,521 were awarded in a settled action at Durham Assizes to a former miner, who, it was stated, had had to wear springs on his feet to help him to walk since a pit accident nearly three years ago. Mr. Justice Lloyd-Jacob gave judgment by consent for Mr. Joseph Wilson (37), who brought a claim against the National Coal Board. His counsel, Mr. D. Fenwick, announced that the parties had come to terms.

In October, 1958, Mr. Wilson received multiple injuries when he was trapped by a fall of stone at Langley Park Colliery while working as a stoneman. He is now a semi-paraplegic. No order was made as to costs.

FINE OF £20 was imposed on Guest Keen & Nettlefolds (Cwmbran), Limited, at Caerleon Magistrates' Court, for contravening the Factories Act, 1937, by not having a dangerous part of machinery securely fenced. The case arose after Mr. Cyril John Francis, an employee at the factory, trapped his hand in unguarded machinery.

PIPE FITTER, Mr. James Edward Hughes, who was injured in a fall while working at Mexborough (Yorks) power station five years ago, sued the contractors, Richardsons, Westgarth & Company, Limited, West Hartlepool, for damages at Rotherham County Court. After considering legal points, Judge Ernest Ould said he would reserve judgment until the next sitting.

HIGHER SALES BY MUREX

MUREX, Limited, metallurgists, etc., of Rainham (Essex), is paying a final dividend of 8 per cent. making 13 per cent. for the year to April 30, 1961, against the previous year's equivalent distribution, including bonus, of 12.86 per cent. Net profit is £691,000 (£707,000) after tax of £660,000 (£639,000).

The directors state that the satisfactory demand for the company's metallurgical products reported in December continued during the remainder of the financial year, and sales turnover rose by 12½ per cent., due mainly to the increase in the volume of products sold.

Sales of welding electrodes were substantially unchanged, though sales of welding equipment were lower. Reduced selling prices and the absorption of increases in raw material costs resulted in lower profits for Murex Welding Processes, Limited.

Two New Wellman Smith Owen Subsidiaries

DUE to the expansion of its activities, the Wellman Smith Owen Engineering Corporation, Limited, has decided to segregate and operate the sales organizations of its divisions dealing respectively with cranes and mechanical handling equipment and rolling-mill equipment as separate subsidiary companies under the titles of Wellman Crane & Machine Company, Limited, and Wellman Rolling Mills, Limited.

Mr. J. N. Rees, general sales manager (mechanical division) of the corporation, has been appointed managing director of Wellman Crane & Machine Company, the board of which also includes Mr. V. Bellingham, Mr. D. E. Pope, Mr. J. H. Knight, Mr. W. R. Robertson, Mr. S. W. Taylor, and Mr. E. H. Dickson. The board of Wellman Rolling Mills will consist of Mr. Cyril Brooks (managing director), Mr. V. Bellingham, Mr. G. W. Clamp, Mr. R. Curdie, Mr. D. H. Goodreid, Mr. R. C. Lees, and Mr. A. V. McCumiskey.

Operations of these subsidiaries will be supported by the full engineering and manufacturing resources of the Wellman group for the design and construction of cranes and handling machinery for the metallurgical and other industries, and for the design and construction of rolling-mill equipment comprising strip processing lines, seamless tube making plants, and also, in association with Schloemann A.G., rolling mills for the hot and cold rolling of steel and non-ferrous metals.

BEAMA Electronics Board

THE British Electrical and Allied Manufacturers' Association Council has established an electronics board to represent that part of the BEAMA membership directly concerned with electronic engineering. This new board will act for the BEAM Council on matters of broad policy in this field, and will provide the necessary liaison with Government Departments and other Associations on policy matters affecting the electronic industry.

The initial membership of the board includes: Mr. Leon Bagrit (Elliot Bros., Limited), chairman; Mr. O. W. Humphreys (General Electric Company, Limited); vice-chairman; Mr. W. S. Steel (Associated Electrical Industries, Limited); Mr. Sebastian de Ferranti (Ferranti, Limited); Mr. C. Metcalfe (Electric & Musical Industries, Limited), and Mr. W. Gregson (Ferranti, Limited).

Francis Shaw to Overhaul Engineering Department

STEPS are being taken to increase the efficiency of the engineering department of Francis Shaw & Company, Limited, manufacturers of rubber, hydraulic and plastics machinery, of Manchester. At the annual meeting on Thursday of last week, Dr. J. G. Mackay, chairman of the company, described the department as "the nerve centre of our business," and said some streamlining of the organization had taken place and efforts had been made to increase efficiency and reduce costs.

The company was thinking about extending the apprenticeship scheme it had introduced, he said.

Company News

COLVILLES' RIGHTS ISSUE

New Share Proposals Approved

SHAREHOLDERS of Colvilles, Limited, the steel and iron company, approved last Friday the proposed issue of 5,324,906 new ordinary £1 shares on a rights basis of 57s. 6d. each, with rights to the Ordinary and 6 per cent. Convertible debenture holders. Sir Andrew McCance, chairman, told the meeting that the issue had been very carefully considered by the directors in the light of the company's present situation, and the board was of the opinion that it was clearly in the interests of the company to proceed with it, in accordance with arrangements already made.

This view, said Sir Andrew, had received substantial support from the shareholders, as the proxies which he held for the meeting were "overwhelmingly in favour" of the proposal. "This has been particularly gratifying to the board, since the general market conditions today are somewhat different from the conditions which existed at the time the decision to proceed with this issue was made."

Temporary fluctuations in market conditions, the chairman declared, did not affect the long-term prospects, and so far as Colvilles was concerned the long-term prospects were good.

Sharp Fall in Profits of General Electric

GROSS sales income of the General Electric Company, Limited, increased from £116,900,000 to £118,600,000 in the year ended March 31, 1961, but profits contracted sharply. Preliminary results show trading profits down from £4,530,766 to £2,892,209 and the group net profit of £1,377,677 compares with £2,532,384 of which £1,094,801 against £2,322,135 is attributable to the holding company.

Two factors, state the directors, were mainly responsible for the reduction in profits. In the first place, margins in the heavy engineering industry were "meagre" and contributed little to the year's earnings. Secondly, the extremely unsatisfactory state of trade during the year in the radio, television and domestic equipment industries resulted in substantial losses.

Dividends totalling 10 per cent. (same) have been paid for the year on the £18,000,000 Ordinary.

WARD & GOLDSTONE, LIMITED, manufacturers of electrical accessories, etc., of Salford (Lancs)—In the first quarter of its current year the company achieved sales exceeding those in the same period of the previous year, Mr. S. Goldstone, the chairman, told the annual meeting on Wednesday.

HOLMAN BROS., LIMITED, manufacturers of mining, quarrying and pneumatic plant, etc., of Camborne (Cornwall)—Final divided is being halved to 4 per cent., making, with the unchanged 4 per cent. interim, a total of 8 (12) per cent. for the year to March 31, 1961. Group net profit attributable to the company fell to £132,538 (£162,999) after tax of £138,820 (£161,940).

AMALGAMATED ANTHRACITE HOLDINGS, LIMITED—Consolidated net profits for 1960 increased to £384,684 (£279,807) after tax of £236,180 (£279,807), and the dividend is being raised to 16 (12½) per cent. Consolidated trading profits of the subsidiary British Anthracite group increased from £704,955 to £1,025,044, and its net balance, after outside interests and pre-acquisition profits, from £313,426 to £399,557.

ALFRED HERBERT, LIMITED, machine tool makers, of Coventry (Warwicks)—Orders from home and oversea markets continue to be received at a satisfactory level and there is good reason to expect that profits for the current year to October 31, 1961, will not be less than those for last year. An interim dividend of 2½ per cent., tax-free, is maintained. It was followed last year by a final of 6 per cent. tax free.

MINERALS SEPARATION, LIMITED, London, E.C.4—The company has converted its holding of unsecured loan stock of Shermin Investments, Limited, into Ordinary shares of £1 each, at par. As a result, the company now holds 73 per cent. of the equity of Shermin Investments, which has become a subsidiary. Shermin has acquired all the issued capital of Hogg & Ross, Limited, manufacturers of medical and surgical equipment, of Dundee.

DOWTY GROUP, LIMITED—Group profits for the year to March 31, 1961, are £2,525,668 (£3,036,863) against the £2,500,000 forecast. Final dividend, as expected, is maintained at 5½ per cent. tax free, on £6,100,000 capital increased by the acquisition of Boulton Paul Aircraft, Limited, making, with the interim on £5,600,000 capital, 9½ (9.1 equivalent) per cent. tax free. Net balance, after tax of £1,196,454 (£1,466,043), is £1,329,214 (£1,570,820).

BERRY'S ELECTRICAL MAGICOAL, LIMITED—In his annual review, the chairman, Mr. Raymond Berry, states that the current year has started well and at the end of the first quarter the rate of progress was being maintained. In the year to March 31, 1961, there had been an increase in sales of 42 per cent. and in trading profit of 31 per cent. With the increase in total sales the company had been able to neutralize the effect of higher production costs. Mr. Berry expected export sales to show an appreciable increase.

HATTERSLEY (ORMSKIRK) LIMITED, textile engineers, of Ormskirk (Lancs)—At the annual meeting, Mr. H. C. Nicholson, chairman, said it is intended in the near future to make a share exchange offer for the 112,500 ordinary 10s. shares not already owned by the company in its subsidiary, Beck & Company (Meters), Limited. Hattersley's present holding amounts to 75 per cent. of the ordinary. For the first three months of the current year, sales of Hattersley compared very favourably with those of a year ago, although margins, through increased costs, were showing no improvement.

Smokeless Fuel Allowances : Pit Deputies Accept

AT a meeting held in Barnsley recently, the Yorkshire council of the National Association of Colliery Overmen, Deputies, and Shotfirers mandated their delegates to a special national conference in London to accept the National Coal Board proposals giving smokeless fuel to the value of £42 a year in exchange for the concessionary coal allowance, because of the introduction of smoke-controlled areas.

The agreement for junior officials is the same as that for miners, but in certain circumstances cash adjustments will be made. Mr. Laurie Wormald, Area general secretary of NACODS, said: "There was a great deal of concern that the money would not buy sufficient smokeless fuel to heat the normal house as it had done in the past."

Instructing its delegates to accept the proposals formally at a special national conference in September, the council also instructed the Yorkshire Area to send a resolution calling for 20 shifts in four weeks, compared with the present 22. Mr. Wormald said: "Our officials, without a shadow of doubt, work the longest hours in industry. They do 46 hours a week in five and a half shifts. We want the board to work a four-hour shift system for deputies, instead of the present three-shift system. At present our officials have to do a lot of overtime."

£900,000 Slurry Power Scheme at Yorkshire Colliery

SITE preparation work has begun on a £900,000 scheme for converting slurry into steam and electrical power at Markham Main Colliery, Armthorpe, near Doncaster. The plant, the largest at any colliery in the country, will produce 9,000 kW of electricity an hour for distribution through a system serving six collieries in the area.

A weekly average of 4,500 tons of graded coal at present being used for steam raising at Markham Main will become available for sale when the plant starts to operate. With the exception of a much smaller plant at Dinnington Colliery, the scheme at Markham Main will be the first in Yorkshire, and, if it is successful, the Coal Board may go ahead with other similar schemes.

MIDLANDS MINERS' TRIBUTE TO LATE SIR ROBERT MARTIN

TRIBUTES were paid at the quarterly meeting of the Midland District Miners' Fatal Accident Relief Society in Derby last Saturday to Sir Robert Martin, of Loughborough, the society's chairman since 1916, who died last month. During his 61 years membership of the society, Sir Robert, a former mine-owner, had never missed a meeting. The vice-chairman, Mr. A. C. Overfield, told more than 100 delegates from the Midlands: "All the miners and their families in the area have lost a very real friend."

The meeting elected Mr. W. L. Miron, chairman of the East Midlands Division of the National Coal Board, to succeed Sir Robert as chairman of the society.

Durham NUM Secretary Defends Youth

CONDEMNATION of the "unjustifiable conduct of a very small minority of youths" is made by Mr. Sam Watson, general secretary of the Durham Area of the National Union of Mineworkers, in a letter to the Press. Hooliganism led to some adverse comments being levelled at the Durham Miners' Gala last Saturday and Mr. Watson takes the opportunity of upholding the reputation of the vast majority of young people at the gala.

"We had more youngsters at the gala this year than ever, and for our part we considered them, in dress and gay deportment a credit to the parents and homes from which they came. The "Big Meeting" will not pass away, he maintains. "It is part of the spiritual heritage of our people, one of the indefinable sinews of the mind."

NCB AT BI-CENTENARY OF BRITAIN'S FIRST CANAL

AT the recent bi-centenary celebrations of Britain's first canal, built by the Duke of Bridgewater to carry coal from the Worsley mines to Manchester, the National Coal Board took a big part and used the occasion to publicize the coal industry. Parties were taken through the underground tunnels at Worsley, which were built to carry coal from the face to the surface canal.

The NCB tug "Broadheath" and two canal barges were decorated and took part in a procession of more than 50 engineering, industrial and pleasure craft which went from Worsley to Stretford. The two barges were filled with coal and carried sale slogans.

In connection with the celebrations the Coal Board had a pavilion in the trades exhibition at Worsley ground. In it were illustrated various types of industrial, commercial and domestic heating appliances. A central heating exhibition, mounted on a lorry, illustrated the house-warming plan.

Plan for £400,000 Smokeless Fuel Plant

PLAN to build a £400,000 smokeless fuel plant at Ollerton Colliery—its third in the North Nottinghamshire coalfield—is announced by the National Carbonizing Company, Limited, of Mansfield. The firm hopes to receive planning approval so that construction can start in the autumn. When completed, it would produce about 100,000 tons of Rexco smokeless coal a year. This would step up annual production to over 275,000 tons, including the output of existing plants at Mansfield and Thoresby collieries.

The new plant guarantees a demand for a large proportion of Ollerton Colliery's annual output of 205,000 tons of small cobbles and nuts for at least another 25 years.

TEESSIDE Clean-Air Committee has asked the National Coal Board to erect a plant in the North-east to produce smokeless fuels. Recently there have been complaints that owing to a shortage of fuel, local authorities in the area are having to delay the setting up of smokeless zones.

NEWS IN BRIEF

DEPOSITS of cupreous sulphur ore, estimated at 15,000,000 to 20,000,0000 tons, have been found in North Tröndelag, Norway. Surveys have been carried out by the state-owned Joma Bergverk A/S, which has also made preparations for starting mining operations.

NEW DEPOT at Scunthorpe (Lincs), to serve the north-eastern area of the UK, has been opened by Chamberlain Plant, Limited, the plant hire and sales company of the Chamberlain Industries, Limited, group of companies. Mr. James E. Gilbert has been appointed manager.

SUBSIDIARY of Brook Motors, Limited, Huddersfield, Brook Electric Motors of Canada, Limited, has moved into larger premises on a new trading estate area at Rexdale, near Toronto Airport, which will enable better stock service to be given and a wider variety of types to be made available.

BRITAIN HAS BECOME the largest importer of ships according to figures published on Tuesday by Lloyd's Registrar of Shipping. Tonnage being built oversea for Britain and Northern Ireland rose to a record 693,471 tons at the end of June. At the end of March the figure was 457,000 tons.

THE 300 Babcock & Wilcox, Limited, foundry workers, who had been on strike for three days, returned to work last Friday. They voted for a full resumption on condition that a conference was held on a claim that a man had been dismissed and replaced after the holidays by another.

SINCE JULY 12, contracts worth £16,000,000 have been signed with British firms as a result of the Russian Exhibition at Earls Court, a Russian spokesman said last weekend. Orders worth £1,000,000 had been placed for metal-cutting machine tools, printing machines, fork-lift trucks, etc.

LICENCE AGREEMENT has been signed between Dowty Hydraulic Units, Limited, and Kayaba Industry Company, of Tokyo, for the manufacture in Japan of Dowty hydraulic gear pumps and motors. Manufacture will commence immediately and exclusive selling rights have been granted in Japan, Formosa, Korea and Indonesia.

IN TOTAL STEEL output in the first half of 1961, Japan outstripped Britain to take fourth place after the US, the Soviet Union, and West Germany, according to a report by the Japan Steel Exporters Association. The report stated that Japan's steel production in the period totalled 13,225,000 tons, compared with 12,415,000 tons for Britain.

NEW COMPANY, Bedford Rock Drill Components, Limited, has been formed with £100,000 capital to carry on the business of manufacturers and merchants of engines, rock drills and compressors. The directors are: Mr. Carl E. Holmstrom, Mr. A. Sellars, Mr. E. Ogden, Mr. D. J. Haggie and Mr. R. Gray. The offices are at Lion Works, Mowbray Street, Sheffield.

PRODUCTION OF RAW steel in the US during the week ended July 24 was 1,858,000 net tons, according to figures from the Iron and Steel Institute. This compared with 1,860,000 tons in the preceding week. Raw steel production in the current year totals 50,568,000 tons, a 21.7 per cent. decrease compared with the 64,615,000 tons produced in the corresponding period of 1960.

DURING THEIR two-day visit to Northern Ireland on August 8-9, the Queen and the Duke of Edinburgh will visit the factory of International Computers & Tabulators, Limited, Castlereagh, the Belfast shipyards of Harland & Wolff, Limited, and the Government training centre and rehabilitation unit at Felden, where disabled ex-servicemen are trained in machine operating, engineering, welding, and other occupations.

SOME OF THE final sections for Coventry Cathedral's great west screen, a special lorry load of 60 ft. Delta bronze stressing rods, which will be fixed across the centre of the screen and up to the lofty ceiling on each side, were delivered last week. The frame, 70 ft. high and 51 ft. wide, has been constructed in Delta bronze by the Crittall Manufacturing Company, Limited, Braintree (Essex). The stressing rods were extruded and delivered by the Delta Metal Company, Limited, Birmingham.

ELECTRICAL ENGINEERS of St. Helens Auckland (Co. Durham), Westool, Limited, is to offer houses and bungalows for sale to its employees on special terms to overcome the housing problem which exists in the area. The company is developing an estate of 60 properties near Bishop Auckland for sale exclusively to members of the firms and plans are already being made for the development of other sites to meet the company's likely requirements. Prices of freehold properties will range from £2,300 to £3,000.

NEW DEPOT AT Sandbach (Cheshire) has been established by Henry Sykes, Limited, London, S.E.1, for the sale, hire and servicing of its range of pumps, winches and pile-driving equipment. In particular, the depot will cater for the demand for the firm's "Univac" pumps in the Bolton, Manchester, Leeds, Derby, Stoke, Birmingham, Shrewsbury and Liverpool areas. Address of the new depot is: Henry Sykes, Limited, Cheshire Depot, Studd Green Works, Elworth, Sandbach, Cheshire, (telephone: Sandbach 986).

IN ORDER TO meet home and oversea demands for its Kestrel and Falcon side-operating fork-lift carriers and Lizard electric reach trucks, and to provide for further development of the present and additional models, Materials Handling Equipment (Great Britain) Limited, announces that the parent company, Hunslet (Holdings) Limited, is to allocate greater facilities. From August 14, production and key personnel will be transferred from Maidenhead (Berks), to the Leeds (Yorks), works of the Hunslet Engine Company, Limited. The London and Maidenhead offices of Materials Handling Equipment are to be merged and from August 21 will be located with the Hunslet Group London offices at Locomotive House, 30/34, Buckingham Gate, London, S.W.1 (telephone: SULlivan 2875/6/7/8).

New Iron-ore Venture in Western Australia

JOINT venture to carry out iron-ore exploration in Western Australia has been formed by three international mining companies, Consolidated Gold Fields (Australia), Pty., Cyprus Mines Corporation, of Los Angeles, and Utah Construction and Mining, of San Francisco.

Consolidated Gold Fields (Australia), Pty., and its parent company, Gold Fields Mining and Industrial, are wholly-owned subsidiaries of Consolidated Gold Fields of South Africa.

Britain and Russia to Increase Trade

AGREEMENT has been reached between Britain and Russia that it is "appropriate to take further steps to increase trade" between the two countries, according to a communiqué issued at the end of talks between Mr. Reginald Maudling, President of the Board of Trade, and Mr. Patolichev, the Soviet Minister of Foreign Trade, who was in London on the occasion of the Soviet Exhibition.

The Ministers also agreed that the negotiations for an Anglo-Soviet Treaty of Commerce and Navigation will be resumed in London at the end of this year or early in 1962. They welcomed the success of the British Trade Fair in Moscow and "took note that a substantial volume of Soviet orders for British goods had been placed on that occasion." They were confident that the Soviet Exhibition in London would lead to large orders for Russian goods.

The communiqué added that Mr. Maudling has started consultations with a number of industries in this country about the possibility of concluding long-term contracts for the supply of Soviet goods to the UK.

Company Chairman Calls for Common Market Decision

EVERYONE should remember that higher wages do not necessarily mean an improved standard of living, states Mr. Arthur Riley, chairman and managing director of Robert Riley (Holdings), Limited, manufacturers of precision springs, etc., of Rochdale, in his annual report to shareholders. It is, he states, essential for productivity to rise and all workers should remember that such an increase is in their own interest, as well as being a national responsibility.

Mr. Riley also warns that the effects of the European trade groupings are now beginning to be felt by many industries in this country and he feels that unless some unified policy is shortly agreed between the Common Market and the EFTA the business which this country has long enjoyed from the Common Market countries will be absorbed by more favoured European competitors.

RECORD BUSINESS FOR ECGD

BUSINESS declared under Export Credits Guarantee Department "commercial" insurances during the second quarter of 1961 was £189,200,000, a record for the quarter, though below the record for any quarter of £194,800,000 in January-March, 1961. It was over 17 per cent. up on the business in the corresponding quarter of 1960.

The number and face value of short-term policies current at the end of the quarter—5,537 policies for a total of £777,200,000—were again a record, as against 4,996 policies for £673,000,000 a year ago. New short-term policies during the quarter included one at £1,300,000 per annum for tele-communication equipment, and one at £1,000,000 per annum for general engineering merchants.

ENTORES, LIMITED.—Mr. E. J. L. Budd has been appointed to the board.

Five-man Body Proposed to Control Belgian Coal

FIVE-MAN "Directoire" to control the Belgian coal-mining industry is proposed in a Government Bill which has been tabled in the Senate. It will have wide powers to initiate action and to prohibit it, and Directoire directors will be appointed to all colliery companies producing more than 500,000 tons annually. Price-fixing, market sharing, investment programmes, and colliery closures and amalgamations are included in the scope of the organization.

The Directoire will work with two Ministerial observers who will have power to suspend its decisions temporarily with a view to their annulment by the Economic Affairs Minister. It will have power to appoint special commissioners to take over companies, to implement decisions which the company has refused or neglected to carry out, and will also be able to impose fines without legal procedure. These may be as much as £3,500, or double the value of any coal sold or produced against a Directoire decision.

Intention of the Bill is to put on foot "an energy policy ensuring the regular marketing of domestic production at prices taking account of the requirements and interests of producers and users."

ECSC LOANS TO THREE COMPANIES

LOAN of 115,000,000 Belgian francs at 4¾ per cent. over 20 years has been granted by the High Authority of the European Coal and Steel Community to the Société Provinciale d'Industrialisation, of Liège. The company has been set up to promote industrial zoning in the Liège coal basin, which is affected by the Belgian coal crisis.

The High Authority has also granted a 90,000,000 Belgian francs loan at 4¾ per cent. over 20 years to Phoenix Works Company to build cold-rolled strip mills, on condition that in seeking labour unemployed miners are given preference.

Pending approval by the European Ministers' Council, the High Authority has granted a $527,000 loan to the Belgian Providence Steel Company to assist research on automation in the agglomeration of iron ores.

Rhodesian Steel Mill

NEW sheet mill complex for the Rhodesian Iron & Steel Company, Limited, is expected to come into production towards the end of 1961, states a Barclays Bank DCO report from Southern Rhodesia. As a result of recent expansion of plant, coupled with a fall in demand, the company will have surplus steel available for some time and unless this is absorbed by export markets, some curtailment of operations may become necessary.

Export orders for pig-iron during 1960 amounted to 182,000 tons, of which 150,000 tons are for delivery during the current year and of which about 45,000 tons have already been shipped. A further contract to export 56,000 tons of pig-iron during the first quarter of 1962 has also been secured.

NEW OFFICE BLOCK is to be built in Chesterfield (Derbys), for Birtley Engineering, Limited, a subsidiary of the Birmingham Small Arms Company, Limited.

Board Changes

Sir Miles Thomas Joins Dowty Group Board

CHAIRMAN of Monsanto Chemicals, Limited, Sir Miles Thomas has joined the board of the Dowty Group, Limited. He is chairman of the Development Corporation for Wales, among many other board appointments, and in 1959 was chairman of the British Productivity Council.

Last December, because of "substantially divergent views on matters of basic policy," Sir Miles resigned as deputy chairman of British Glues & Chemicals, Limited. From 1949 to 1956 he was chairman of BOAC.

PARKINSON COWAN, LIMITED—Mr. G.C. S. Greenhead has been appointed to the board.

STAVELEY INDUSTRIES, LIMITED—Sir Peter Roberts, MP, has resigned from the board.

PERRY BARR METAL COMPANY, LIMITED—Mr. F. S. Taylor has been elected a director.

STERLING METALS, LIMITED—Mr. G. A. Rider and Mr. W. Brindley have been elected to the board.

R. B. PULLIN & COMPANY, LIMITED—Dr. Sydney Jones has joined the company as technical director.

BRITISH ANZANI ENGINEERING COMPANY, LIMITED—Mr. James E. Garrick has been appointed a director.

F. PERKINS, LIMITED—Mr. W. N. Collins has resigned as assistant managing director and from the board. He has also resigned from the boards of the company's subsidiaries.

STEIN ATKINSON VICKERS HYDRAULICS, LIMITED,—Mr. F. J. Everest has been appointed director and general manager.

WM. DOXFORD & SONS (ENGINEERS), LIMITED—Mr. R. C. Thompson and Mr. J. F. Butler have been appointed directors.

SUPERHEATER COMPANY, LIMITED—Mr. J. Mayer has been appointed a director and Mr. J. V. Santry has resigned from the board.

MATHER & PLATT, LIMITED—Head of the company's research department, Mr. Thomas A. Uthwatt has been elected to the board.

PLESSEY COMPANY, LIMITED—Mr. A. Robert Enshaw has been appointed executive director in charge of the Government contracts department.

F. FRANCIS & SONS (HOLDINGS), LIMITED—Mr. G. R. F. Scotson has ceased to be joint managing director, but remains on the board.

BRYMBO STEEL WORKS, LIMITED—Mr. Mark Pearce has been appointed to the board of the company, a branch of the G.K.N. Steel Company, Limited.

BRITISH GLUES & CHEMICALS, LIMITED—Mr. D. N. Walton has been appointed chairman in succession to Mr. Harold J. Cotes, who has retired from the board.

LAPORTE CHEMICALS, LIMITED—Director and engineering manager, Mr. B. H. Oldfield is retiring in September and will be succeeded as engineering manager by Mr. Maurice Ruddick.

CONSOLIDATED ZINC CORPORATION, LIMITED—Mr. A. M. Baer, deputy chairman, has been appointed chairman in succession to the late Mr. L. B. Robinson. Lord Baillieu becomes deputy chairman.

ALFRED HERBERT, LIMITED—Mr. B. R. Harrison has been appointed deputy managing director and Mr. A. E. Smith has been appointed an additional director. Mr. K. W. Ellson has resigned from the board.

Coal Chartering

MARKETS have been on a reduced scale and even to Japan fixtures have been limited. Late August/September 15 11,500 tonner has been fixed from the Roads to Japan at $9.85 with 1,000 tons free and for September 1/25 11,000 tons at $9.05 with five days purposes, and 14,000 tons is reported for September and October at $10.00 with free discharge. There are, however, still prospects of working tonnage to Japan either consecutive voyages or possibly contract basis. The only other fixture reported from the Roads is 7,500 tons to Buenos Aires at $6.50 for early loading with interest maintained and there are also inquiries basis Rio de Janeiro. There are prospects of contract business being arranged from the Roads to Antwerp-Rotterdam-Amsterdam, but no single fixtures have been reported. Inquiries are also noted to the Mediterranean and Adriatic.

There is very little inquiry from the UK as far as the Mediterranean is concerned, except for some small interest on West Italian account, but there is nothing of a definite nature quoting to West Africa. On the other hand, handy-size tonnage is not freely available for outward business. The coasting market is also quiet but a reasonable demand is evidenced from the East Coast on Scandinavian account.

New Technical Aid Department Starts Operations

THE Department of Technical Co-operation, a new Government department to co-ordinate UK technical assistance to oversea countries, went into operation on Monday. Mr. Dennis Vosper is the Minister in charge of the Department, and will be known as the Secretary for Technical Co-operation. The Director-General—permanent head of the Department—is Sir Andre Cohen and its headquarters are at Carlton House Terrace, London.

It will take over the present work on technical assistance performed by the three oversea Departments, the Foreign Office, the Commonwealth Relations Office and the Colonial Office, and the Ministry of Labour. The object is to enable the UK to meet more effectively requests for technical assistance received from the Governments of developing countries inside and outside the Commonwealth.

F. PRATT & COMPANY REORGANIZED

MANUFACTURERS of lathe chucks and work-holding devices, F. Pratt & Company, Limited, of Halifax (Yorks), has been reconstituted as a holding company under the name of F. Pratt Engineering Corporation, Limited. A new subsidiary has been formed to carry on the existing manufacture and marketing of the company's products, under the name of F. Pratt & Company, Limited. The business will continue to trade under the same name.

Directors of the new parent company are: Mr. G. K. Galliers-Pratt, chairman; Mr. A. M. G. Galliers-Pratt, vice-chairman; Miss F. M. Buckley and Mr. C. H. Harmer. Mr. A. M. G. Galliers-Pratt has relinquished his position as managing director of F. Burnerd & Company, Limited, another subsidiary, but remains a member of the board. Mr. J. R. Tracy is the new managing director.

Obituary

DR. G. W. TYRELL

THE death occurred on Thursday of last week, at his Bearsden, Glasgow, home, of Dr. GEORGE W. TYRELL, senior lecturer in geology at Glasgow University from 1919 to 1947. He was 78. Born at Watford (Herts), and educated at the Imperial College of Science and Technology, he was appointed assistant lecturer at Glasgow University in 1906, becoming a Fellow of the Royal Society of Edinburgh in 1918. He was president of the Glasgow Geological Society from 1924 to 1926.

Dr. Tyrell was awarded the Murchison Medal of the Geological Society in 1931, the Neill Gold Medal of the Royal Society of Edinburgh in 1934, and the Clough Medal of the Edinburgh Geological Society in 1952.

The death occurred recently at the age of 55, of Mr. ROBERT HALSTEAD PICKLES, a director of John Pickles & Son (Engineers), Limited, Hebden Bridge, (Yorks).

Chairman of the Garrard Engineering & Manufacturing Company, Limited, Mr. HERBERT VAUGHAN SLADE has died at the age of 72. He was made OBE in 1950.

The death has taken place of Mr. C. H. BRADY, who retired only a few weeks ago as manager of the mill office at the Cargo Fleet works of the South Durham Steel & Iron Company, Limited. He was 65, and had served the company for 41 years.

Mr. CHARLES T. GORDON, who was manager of Monifieth (Fife) Foundry, Limited, during the first world war, and was made OBE for work connected with the development and manufacture of tank parts, has died at St. Petersburg, Florida, at the age of 82.

The death occurred recently at the age of 86 of Mr. WILLIAM HENRY CARTER. Starting as a mining student at Glapwell Colliery, Chesterfield, in 1894, he was appointed manager of Bolsover Colliery in 1903, remaining in that position until 1913, when he became manager of Mansfield Colliery. From 1936 until he retired in 1939 he was agent for a group of mines owned by the Bolsover Colliery Company, Limited.

South Africa May Supply Iron to Japan

ANNOUNCEMENT is expected shortly stating whether African Metals Corporation, an associate of the State-owned South African Iron & Steel Industrial Corporation (ISCOR), has secured a contract to supply Japanese steel interests with 500,000 tons of pig-iron annually for the next 10 years.

A four-man Japanese mission, headed by Mr. H. Ozawa, director of Koebe Steelworks, has left South Africa after discussing the proposed contract with Dr. F. Meyer, chairman of ISCOR and AMCOR. It is understood that the contract would be worth £8,750,000 annually.

ANNUAL REPORT OF the National Council for Technological Awards, which covers the year to last March, reveals that nearly 5,000 students were taking courses for the Diploma of Technology, compared with 3,800 a year before.

Shipbuilding Outlook Does Not Affect Caledon Plans

ANOTHER phase of its yard modernization programme, which since the war has cost £1,000,000, is being started by the Caledon Shipbuilding & Engineering Company, Limited, Dundee. About £200,000 is to be invested in this latest stage which will include the construction of a new welding bay. Present plans are that the bulk of the work should be completed by the end of the year.

Magnetic cranes for plant handling are being installed as well as shot blasting equipment. A Sicomat profile burner of the latest design is also being bought. It will be the first of its type in this country, the only other yard in the world so equipped being in Poland.

Mr. E. P. Brown, chairman of Caledon, says that a continuance during the year to March 31, 1961, of improvement in open-market freight rates and a big reduction in laid-up tonnage, have not brought any appreciable increase in the inquiry for new ships. Competition for any fresh vessels is "very severe indeed" and Mr. Brown gives members a warning that prices now obtainable are such that future distributions by the company may well be affected.

The 1960-61 payment was held at 15 per cent. including 5 per cent. bonus, though the group trading profit fell to £343,062 (£606,283). Output was much below capacity and the "relatively favourable" figures are mainly attributed to delivery of vessels ordered some years ago when conditions were quite different from those prevailing today, the chairman explains.

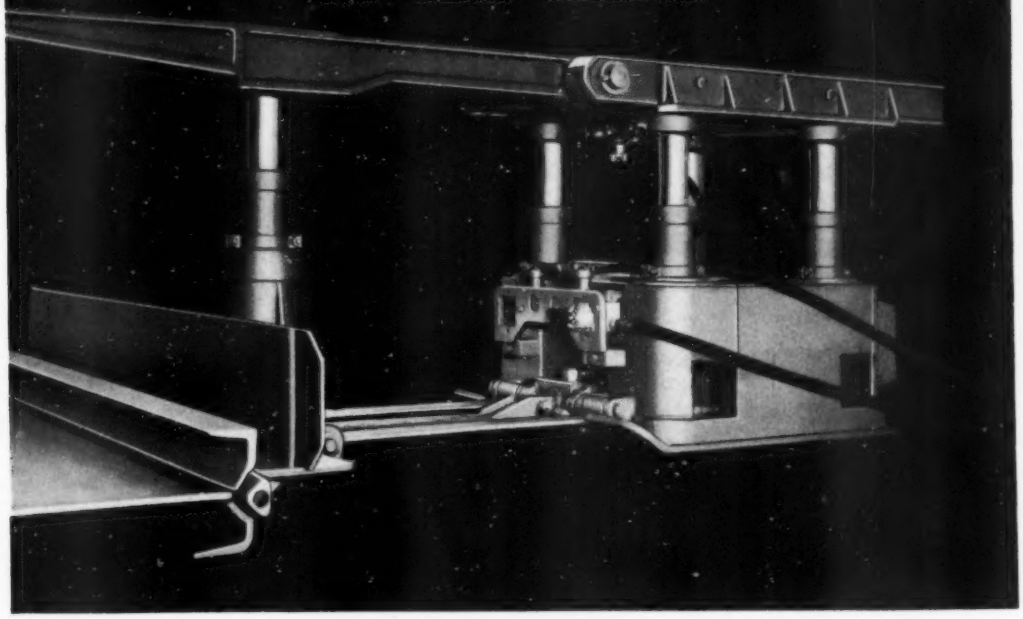
Ore Chartering

MORE miscellaneous business has been arranged between the major markets and, although there is no particular change in the freight structure, markets are with certain exceptions, reasonably steady and owners are disinclined to fix forward. Marmagoa/Continent reports 39s. 6d. f.i.o. for 9,500 tons late July/August 10 and paid 49s. 6d. for 10,000 tons 10 per cent., second half August, to Moji-Chiba Range, while there is still some inquiry to Japan and the Continent.

There is, however, still no particular demand for tonnage to load from the North African coast to the Continent, alhough there is some small interest and burnt ore has been fixed from Porto Marghera to Holland for about 5,000 tons first half August at 24s. 9d. on gross terms. West African ore to the Continent is quiet, although Pepel/Continent reports business at 27s. 6d. Some potash business has been arranged from Barcelona to Japan for September on the basis of between $9.50 and $10.00 f.i.o. and a 2,800 tonner for prompt loading was recently fixed to Leith at 29s. f.i.o.

Although Morphou Bay pyrites secured 8,500 tons West Coast UK at 40s. on gross terms for late August, about similar size was also fixed to Hull or Immingham, second half August, at 39s. and 7,500 tons has been taken for Ghent for August 1/15 at 30s. At the present moment there is quite a fair inquiry from this loading port, mostly to Continental discharge. Huelva/Rotterdam paid 21s. for handy size prompt loading. Casablanca phosphate to Rotterdam fixed 8,500 tons at 19s. 6d. for August 1/15 and there is some inquiry for UK discharge.

THE GULLICK "SEAMAN" POWER ADVANCED SUPPORT for Low Seams



the 5-leg Chock developed from experience has 5 strong points

1. **Strong Waste Edge Support** to give good caving; maintains two rows of support between the Waste Edge and the Operator, and prevents waste flushing.
2. **Front leg, designed to be as close to the face as possible** and providing the forward support required, yet causing the least hindrance to the power loader operator.
3. **Maximum travelling track** provided by good design of roof bar, and Ram arrangement. With this Chock travelling is as good as conventional faces using props and link bars.
4. **Hinged roof bar and three rows of props** in the chock ensure the maximum distribution of load to the roof, throughout the whole width of the face.
5. **Safe hydraulic fluid** (water/soluble oil) together with the other features combine to ensure good roof control and the safest power advanced support yet devised.

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G31

Exports of British Coal

DETAILS of British coal exports and bunker coal shipments in June, and the totals for the first six months of this year and last, are given below.

	Month ended June 30.	Six months ended June 30.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Categories.			
Anthracite—			
Large	6,889	35,353	36,643
Graded	18,228	119,908	119,037
Cleaned smalls	48,683	111,731	143,668
All other	33,853	147,880	203,159
Steam coal (including household)—			
Large	39,897	317,834	283,751
Graded	18,276	206,382	135,271
Cleaned smalls	120,169	552,035	666,690
Untreated smalls	117,834	541,930	706,449
Other	21,098	94,555	86,774
Gas coal—			
Unscreened	18,487	107,324	69,047
Graded	31,926	199,986	189,690
All other	6,000	23,069	19,834
Coking coals	12,748	71,249	96,102
TOTAL	494,088	2,529,686	2,756,115
Destinations.			
Canada	5,318	28,755	18,936
Other Commonwealth countries	523	14,269	5,473
Eire	87,657	598,022	609,759
Finland	815	20,738	32,306
Sweden	15,683	91,762	103,203
Norway	12,400	58,102	58,713
Denmark	112,344	766,953	594,751
Western Germany	39,040	215,205	261,242
Netherlands	112,293	402,842	588,068
Belgium	27,560	81,071	125,634
France	59,403	85,955	182,278
Portugal	10,223	83,120	86,165
Italy	10,228	59,254	67,120
Other foreign countries	601	23,638	22,467
Fuel taken on board vessels engaged in the foreign trade (including fishing vessels) for their own use—			
British flag	7,397	204,806	46,908
Other flags	3,330	20,583	16,346

Exports of Coke and Patent Fuel

THE following table gives figures of exports of coke and manufactured fuels from the United Kingdom during June, and the totals for the first six months of this year and last.

	Month ended June 30.	Six months ended June 30.	
	1961.	1961.	1961.
	Tons.	Tons.	Tons.
Gas coke	60,699	288,446	324,592
Hard coke	41,553	229,643	175,839
Breeze	35,526	197,952	178,116
Manufactured fuel	3,685	56,123	38,400
TOTAL	101,463	772,164	716,947

FIVE EMPLOYEES of Firth-Vickers Stainless Steels, Limited, Sheffield, were presented with awards for 50 years' service by Mr. J. T. W. Dewar, managing director, on Thursday of last week.

Imports and Exports of Mining Machinery

ACCORDING to Board of Trade returns, mining machinery (other than portable power tools) valued at £219,954 was imported during June, compared with £112,205 in June, 1960. Imports for the first five months of the year were valued at £982,659 against £551,755 in the corresponding period of 1960.

The appended table contains figures of export values of mining and well-drilling machinery in June and values for the first six months of this year and last.

Destination.	Month ended June 30. 1961.	Six months ended June 30. 1960.	1961.
	£	£	£
Union of South Africa	113,416	292,381	396,495
India	129,946	608,793	540,531
Australia	18,798	205,512	169,492
Canada	47,266	180,399	230,639
Trinidad	15,997	216,308	80,464
Other Commonwealth countries and Eire	286,455	669,967	945,475
Argentina	28	312,559	19,501
Other foreign countries	224,632	1,379,896	1,497,962
TOTALS			
Well-drilling machinery—			
Petroleum	115,563	1,375,141	895,851
Other	47,907	230,070	259,556
Mining machinery (excluding portable power tools)—			
Coal-cutters, power operated—			
Complete	24,158	249,004	242,238
Parts	64,952	414,728	411,560
Conveyors, underground—			
Complete and parts	26,617	595,007	459,299
Winders, power operated	245,772	227,265	535,044
All other	311,569	774,600	1,077,011
TOTAL	836,538	3,865,815	3,880,559

Plan to Restart Ruhr Coal Cartel

PLAN which will allow the Ruhr coal cartel to be restarted on a temporary footing and subject to certain safeguards was agreed in Luxembourg recently by the Council of Ministers of the European Coal and Steel Community. The scheme, for which Germany has long been pressing, will operate only when some part of the coal or steel industries is affected by "fundamental and persistent" troubles. It will then be permissible for the High Authority to authorize schemes of rationalization and for joint sales or purchases.

Joint selling schemes, however, will only be permissible when a rationalization or recovery scheme already exists and they must be subsidiary to it. They must not be more restrictive than is necessary to deal with conditions prevailing.

Since an amendment is needed to the ECSC Treaty, the plan must now be submitted to the Court of Justice. If the Court rules that this may rank as a minor amendment it can be put through without ratification by the six Parliaments. It will first, however, require the approval of the European Parliamentary Assembly.

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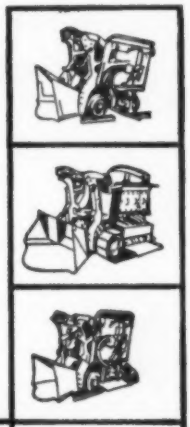

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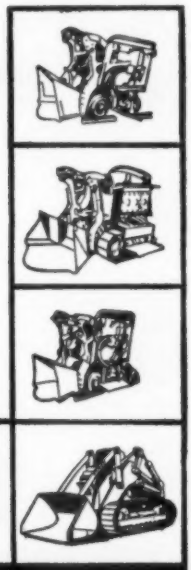

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Exports of British Coal

DETAILS of British coal exports and bunker coal shipments in June, and the totals for the first six months of this year and last, are given below.

	Month ended June 30.	Six months ended June 30.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Categories.			
Anthracite—			
Large	6,889	35,353	36,643
Graded	18,228	119,908	119,037
Cleaned smalls	48,683	111,731	143,668
All other	33,853	147,880	203,159
Steam coal (including household)—			
Large	39,897	317,834	283,751
Graded	18,276	206,382	135,271
Cleaned smalls	120,169	552,035	666,690
Untreated smalls	117,834	541,930	706,449
Other	21,098	94,555	86,774
Gas coal—			
Unscreened	18,487	107,324	69,047
Graded	31,926	199,986	189,690
All other	6,000	23,069	19,834
Coking coals	12,748	71,249	96,102
TOTAL	494,088	2,529,686	2,756,115
Destinations.			
Canada	5,318	28,755	18,936
Other Commonwealth countries	523	14,269	5,473
Eire	87,657	598,022	609,759
Finland	815	20,738	32,306
Sweden	15,683	91,762	103,203
Norway	12,400	58,102	58,713
Denmark	112,344	766,953	594,751
Western Germany	39,040	215,205	261,242
Netherlands	112,293	402,842	588,068
Belgium	27,560	81,071	125,634
France	59,403	85,955	182,278
Portugal	10,223	83,120	86,165
Italy	10,228	59,254	67,120
Other foreign countries	601	23,638	22,467
Fuel taken on board vessels engaged in the foreign trade (including fishing vessels) for their own use—			
British flag	7,397	204,806	46,908
Other flags	3,330	20,583	16,346

Exports of Coke and Patent Fuel

THE following table gives figures of exports of coke and manufactured fuels from the United Kingdom during June, and the totals for the first six months of this year and last.

	Month ended June 30.	Six months ended June 30.	
	1961.	1961.	1961.
	Tons.	Tons.	Tons.
Gas coke	60,699	288,446	324,592
Hard coke	41,553	229,643	175,839
Breeze	35,526	197,952	178,116
Manufactured fuel	3,685	56,123	38,400
TOTAL	101,463	772,164	716,947

FIVE EMPLOYEES of Firth-Vickers Stainless Steels, Limited, Sheffield, were presented with awards for 50 years' service by Mr. J. T. W. Dewar, managing director, on Thursday of last week.

Imports and Exports of Mining Machinery

ACCORDING to Board of Trade returns, mining machinery (other than portable power tools) valued at £219,954 was imported during June, compared with £112,205 in June, 1960. Imports for the first five months of the year were valued at £982,659 against £551,755 in the corresponding period of 1960.

The appended table contains figures of export values of mining and well-drilling machinery in June and values for the first six months of this year and last.

Destination.	Month ended June 30. 1961.	Six months ended June 30. 1960.	Six months ended June 30. 1961.
	£	£	£
Union of South Africa	113,416	292,381	396,495
India	129,946	608,793	540,531
Australia	18,798	205,512	169,492
Canada	47,266	180,399	230,639
Trinidad	15,997	216,308	80,464
Other Commonwealth countries and Eire	286,455	669,967	945,475
Argentina	28	312,559	19,501
Other foreign countries	224,632	1,379,896	1,497,962
TOTALS			
Well-drilling machinery—			
Petroleum	115,563	1,375,141	895,851
Other	47,907	230,070	259,556
Mining machinery (excluding portable power tools)—			
Coal-cutters, power operated—			
Complete	24,158	249,004	242,238
Parts	64,952	414,728	411,560
Conveyors, underground—			
Complete and parts	26,617	595,007	459,299
Winders, power operated	245,772	227,265	535,044
All other	311,569	774,600	1,077,011
TOTAL	836,538	3,865,815	3,880,559

Plan to Restart Ruhr Coal Cartel

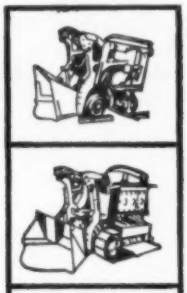
PLAN which will allow the Ruhr coal cartel to be restarted on a temporary footing and subject to certain safeguards was agreed in Luxembourg recently by the Council of Ministers of the European Coal and Steel Community. The scheme, for which Germany has long been pressing, will operate only when some part of the coal or steel industries is affected by "fundamental and persistent" troubles. It will then be permissible for the High Authority to authorize schemes of rationalization and for joint sales or purchases.

Joint selling schemes, however, will only be permissible when a rationalization or recovery scheme already exists and they must be subsidiary to it. They must not be more restrictive than is necessary to deal with conditions prevailing.

Since an amendment is needed to the ECSC Treaty, the plan must now be submitted to the Court of Justice. If the Court rules that this may rank as a minor amendment it can be put through without ratification by the six Parliaments. It will first, however, require the approval of the European Parliamentary Assembly.

MEMBERS OF THE Institution of Mining Engineers last week visited the Loughborough (Leics), works of the Brush Electrical Engineering Company, Limited, a member of the Hawker Siddeley Group, Limited.

Wherever the going is tough you'll find an EIMCO



However arduous the conditions, you will find that Eimco equipment steps up output, reduces down time, cuts costs and stays on the job longer—much longer.

If YOU have a tough job you can't beat an Eimco

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P3460

Imports and Exports of Iron and Steel

FIGURES of imports and exports of iron and steel in June are given in the following tables, based on the Board of Trade returns, and including totals for the first six months of 1960 and 1961.

Total Exports of Iron and Steel

Destination.	Month ended June 30.	Six months ended June 30.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Malta	474	3,775	3,044
Sierra Leone	906	2,809	5,904
Ghana	1,281	9,980	9,446
Nigeria	4,079	30,989	38,740
Union of South Africa	4,743	39,903	32,830
South-West Africa	1,038	4,603	8,211
Rhodesia and Nyasaland	2,681	13,152	18,573
Tanganyika	3,232	6,356	15,002
Kenya	2,867	15,062	20,378
Uganda	122	683	2,230
Mauritius	118	2,276	1,237
Bahrein, Qatar, and Trucial States	676	8,324	10,021
Kuwait	602	4,211	10,938
India	17,209	127,378	108,036
Pakistan	16,258	35,072	47,879
Singapore	1,828	9,638	14,877
Malaya	1,601	10,561	14,043
Ceylon	4,198	30,022	23,624
British North Borneo	43	2,278	1,170
Hongkong	9,867	42,466	40,993
Australia	5,886	83,924	81,259
New Zealand	13,736	50,737	142,431
Canada	10,991	127,410	71,343
Jamaica	1,351	12,811	9,116
Tinidad	4,909	22,450	22,909
British Guiana	945	4,577	5,275
Other Commonwealth countries	3,347	13,555	14,839
Eire	5,420	30,694	37,464
Soviet Union	1,387	16,969	11,940
Finland	5,401	22,855	30,942
Sweden	13,854	94,685	90,097
Norway	9,749	63,472	66,948
Denmark	11,895	50,808	48,748
Poland	1,837	5,495	12,649
Western Germany	10,272	78,856	52,152
Eastern Germany	3,426	12,771	13,915
Netherlands	8,757	66,205	69,990
Belgium	1,485	19,854	14,753
France	1,184	3,289	6,969
Switzerland	2,099	6,440	12,290
Portugal	2,240	7,980	13,336
Spain	1,439	26,668	11,658
Italy	5,581	21,423	34,331
Austria	365	2,677	2,712
Yugoslavia	463	21,804	19,101
Greece	4,537	8,231	19,181
Turkey	1,119	5,911	9,462
Netherlands Antilles	49	2,262	434
Portuguese East Africa	160	2,062	1,531
Egypt	323	6,568	17,170
Libya	572	7,020	4,920
Sudan	1,327	5,094	5,181
Israel	3,023	11,243	12,682
Saudi Arabia	36	214	746
Iraq	922	15,184	22,196
Iran	4,054	37,676	18,407
Burma	606	4,071	2,987
Thailand	426	3,154	2,995
Indonesia	73	15,049	2,632
China	360	31,171	10,085
Japan	32,313	40,306	85,553
Philippine Republic	497	4,684	2,371
USA	10,750	140,782	65,361
Cuba	72	5,202	847
Mexico	127	4,015	2,118
Colombia	471	5,166	5,875
Venezuela	2,984	22,871	13,107
Ecuador	110	1,528	1,555
Peru	823	3,441	4,692
Chile	240	1,622	2,051
Brazil	2,143	19,855	10,637
Uruguay	737	4,983	4,931
Argentina	16,560	49,585	85,291
Other foreign countries	8,186	34,061	38,689
TOTAL	295,442	1,760,958	1,778,030

Total Imports of Iron and Steel

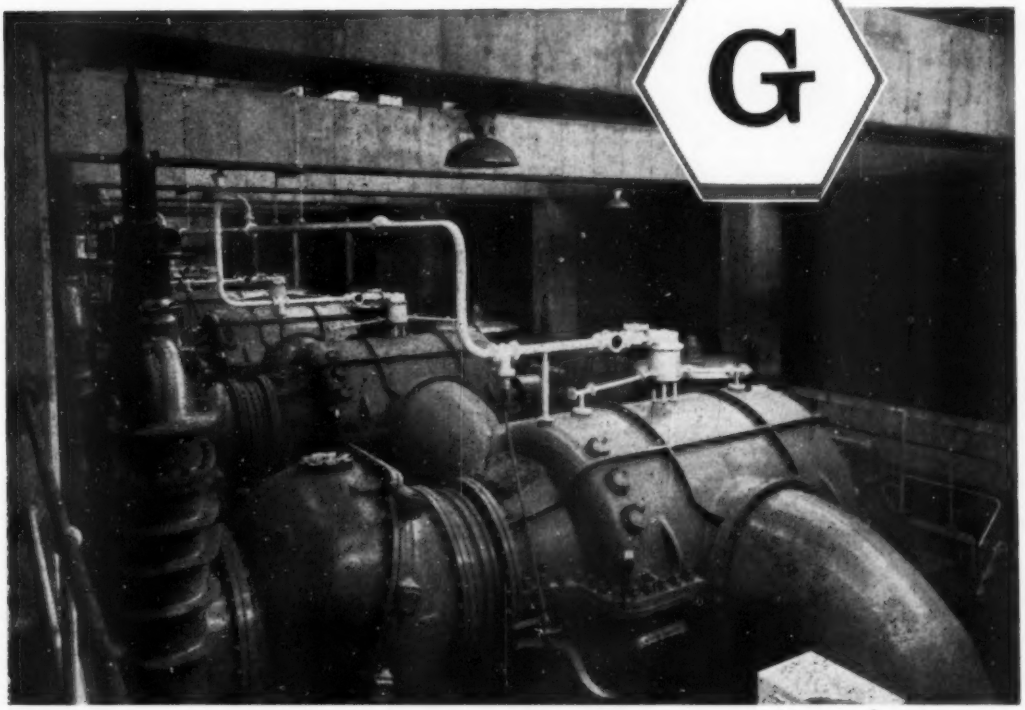
From	Month ended June 30.	Six months ended June 30.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Union of South Africa	2,707	19,003	19,708
Rhodesia and Nyasaland	577	3,834	17,424
Canada	2,179	45,543	60,146
Other Commonwealth countries and Eire	3,110	14,810	17,294
Soviet Union	584	17,685	9,923
Sweden	4,277	24,004	27,678
Norway	10,963	75,948	60,272
Poland	90	7,917	652
Western Germany	1,436	79,168	16,342
Netherlands	10,566	113,922	59,668
Belgium	1,697	61,151	23,345
Luxembourg	—	8,027	10,019
France	963	35,580	11,445
Italy	15	17,077	265
Austria	129	6,621	2,754
Japan	704	3,448	3,893
USA	1,087	175,087	7,834
Other foreign countries	556	46,913	6,620
TOTAL	41,740	755,738	355,282
Iron and steel scrap and waste fit only for the recovery of metal	2,244	72,653	11,902

Exports of Iron and Steel by Product

Product.	Month ended June 30.	Six months ended June 30.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Pig-iron	7,416	92,540	48,729
Ferro-columbium (niobium)	18	74	37
Ferro-tungsten	139	486	581
Other ferro-alloys	259	5,661	1,872
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars) and similar primary forms	15,924	20,543	54,753
Pieces roughly shaped by forging	262	811	1,311
Iron bars, rods, angles, shapes, and sections	196	851	1,151
Steel bars, rods, angles, sections, and shapes	59,009	326,221	363,305
Iron plates and sheets	26	415	240
Universal plates	801	10,495	8,461
Steel plate, 3 mm. and under 4·5 mm. thickness	4,363	20,669	20,251
Ditto, 4·5 mm. or more in thickness	34,813	175,584	180,725
Blacksheets and blackplate	36,979	153,308	197,608
Hoop and strip	8,355	50,735	63,307
Tinplate	34,966	275,192	224,591
Decorated tinplate	475	2,366	3,636
Galvanized sheets	6,182	42,566	37,779
Other (incl. tinned sheets, terneplate, and ternesheets)	3,315	15,085	21,141
Railway and tramway construction material	16,472	80,967	114,383
Wire rods of steel (incl. alloy steel)	7,305	28,646	34,526
Wire	12,040	63,740	70,054
Tubes, pipes, and fittings	46,047	394,052	329,589
TOTAL	295,442	1,760,458	1,778,030

FRENCH SUBSIDIARY of the Rheostatic Company, Limited, La Thermostatique, SA, has now become a wholly-owned subsidiary of the Elliott-Automation, Limited, group, of which the Rheostatic Company is a member. Recently Elliott-Automation acquired a minority shareholding in La Thermostatique by an exchange of shares in that company for Elliott-Automation ordinary shares. The Rheostatic Company has now negotiated the purchase of the balance of the shares in La Thermostatique for cash.

21,000,000 GALLONS AN HOUR FOR BELVEDERE POWER STATION



Wherever river, canal, or sea-water is needed in large quantities for public electricity supply or industrial power stations Richardsons Westgarth strainers will clean it efficiently and on almost any scale. The illustration shows some of the seven Richardsons Westgarth strainers that deliver 21,000,000 gallons of clean cooling water an hour to the condensers at the Belvedere Power Station of the C.E.G.B. These strainers are self-cleaning, operate continuously, and the accumulated sludge can be blown out at intervals without appreciably affecting the flow. Capacities range from 160,000 to 5,000,000 gallons an hour. Full technical details are available on request.

RICHARDSONS WESTGARTH (HARTLEPOOL) LTD.

A member of the RICHARDSONS WESTGARTH GROUP
HARTLEPOOL, CO. DURHAM and at 58 VICTORIA STREET, LONDON, S.W.1.
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RW89

CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Number 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.

Advertisements accompanied by a remittance and replies to Box Numbers should be addressed to the Advertisement Manager, Iron and Coal, John Adam House, 17/19, John Adam Street, London, W.C.2. If received by first post Tuesday, they can normally be accommodated in the next Friday's issue.

SITUATIONS VACANT

LAND SURVEYORS
required by
AIR MINISTRY WORKS ORGANISATION IN LONDON

SALARY (inner London scale) Grade III, £658 rising to max. of £1,048 (£866 at age 25)—starting salary depends on age, qualifications and experience.

Qualifications and Experience: Candidates should have had at least three years' training and experience and preferably hold the Mine Surveyor's Certificate or O.N.C. (Mine Surveying) or equivalent. Experience is required in either:—

(*a*) Astronomical/Geodetic surveying and associated field computations, or

(*b*) Engineering surveying for major civil engineering development projects.

Conditions: Frequent visits to all parts of British Isles involved during which travelling and subsistence allowances payable. Five-day week with 18 days paid leave p.a. initially. Financial assistance and time off may be allowed for courses leading to recognised qualifications. Promotion and pension prospects.

Applicants, who must be natural born British subjects, up to age 25, should write to MANAGER (PE 2121), MINISTRY OF LABOUR, PROFESSIONAL & EXECUTIVE REGISTER, Atlantic House, Farringdon Street, London, E.C.4, giving age, details of training, qualifications and full particulars of former posts held. Candidates selected will normally be interviewed in London and certain expenses reimbursed. Only candidates selected for interview will be notified.

INLAND REVENUE VALUATION OFFICE

PENSIONABLE posts for qualified men as 3rd Class Valuers in the Mineral Section, which has offices in London, Birmingham, Leeds, Newcastle upon Tyne, and Cardiff. Age: at least 24 and under 34 on 1.10.61; extension for candidates with regular Forces service or Overseas Civil Service. Qualifications: Final examination of R.I.C.S., C.A. and E.A.I., or C.L.A.S., or B.A. (Cantab.) or B.Sc. (Lond.) in Estate management (preferably Final examination of R.I.C.S. in Mining sub-division) or 1st Class Certificate of Competency (Mine Managers); knowledge of mining subsidence and the principles of valuation of minerals; at least four years' experience of mining. Starting salary (Inner London) from £913 (24) to £1,318 (34 or over); scale maximum £1,490. Promotion prospects. Write CIVIL SERVICE COMMISSION, Burlington Gardens, London, W.1, for application form, quoting 149/61/10. Closing date 17th October, 1961.

TECHNICAL REPRESENTATIVES MINING EQUIPMENT

INTERESTING and rewarding vacancies exist for technical representatives for hydraulic and other underground equipment; covering the EAST MIDLANDS and N. & C. division of the Coal Board.

Applications must detail education, training and previous experience and salary required to:—

PERSONNEL MANAGER,
B.R.D. COMPANY LIMITED,
Aldridge, Staffs.

SITUATIONS VACANT—*contd.*

COAL MARKETING
SENIOR TECHNICAL POST

The National Coal Board wish to make a senior technical appointment in their Marketing Department at London Headquarters.

The successful applicant will be engaged in the promotion of new uses of coal in industry and will be expected to keep in contact with development associated with such promotion. He will be required to deal with industrial firms at high level. A good scientific or engineering background, high professional standing and a sound knowledge of large scale heavy industry are required.

The salary would be substantial and there are excellent conditions of service.

Write giving full details to Headquarters Staff Manager (X.2335E), N.C.B., Hobart House, Grosvenor Place, London, S.W.1.

B.R.D. COMPANY LIMITED
Aldridge, Staffs.

ARE setting up a Design Team, to develop Mining Equipment and require:—

DESIGN TEAM LEADER—who should be a Mechanical Engineer having a wide experience of modern mining techniques. Technical qualifications must be at least H.N.C. Reference M.E.D. 11.

DESIGN DRAUGHTSMAN—Hydraulics.

This position requires an experienced draughtsman with a wide knowledge of hydraulic control systems, and preferably experience of modern mining equipment. Technical qualifications to O.N.C. standard are necessary. Reference M.E.D.12.

DESIGN DRAUGHTSMAN—Structural.

This position requires a draughtsman experienced in steel structures and fabrication techniques. Technical qualifications to O.N.C., at least. Reference M.E.D. 13.

All these positions carry a salary commensurate with the experience and responsibilities.

Applications should give full details of education, training and experience, and should be addressed to:

PERSONNEL MANAGER,
B.R.D. COMPANY LIMITED,
Aldridge,
Staffs.

Quoting appropriate reference number.

VACANCIES exist with a large British controlled Company in India for the senior posts of (1) CHIEF ENGINEER and (2) MINING ENGINEER for their collieries in India. The Chief Engineer should be fully qualified and experienced in colliery Mechanical and Electrical Engineering, staff administration, installation, maintenance and repair of mining machinery and Workshop practice. The Mining Engineer should be well qualified and have all-round experience of mining practice and administration in a post not below the grade of Manager of a large mine. Terms will be attractive and according to experience. Please reply giving full details, age, married or single, family, qualifications and experience, testimonials, present position, etc., to Box VE415, IRON AND COAL.

SITUATIONS VACANT—*contd.*

LLOYDS (BURTON) LIMITED
require a
DEMONSTRATOR/SERVICE ENGINEER
for their
MINING DIVISION

APPLICANTS must have thorough coal face experience particularly with respect to ROOF SUPPORT. He must be prepared to travel and be capable of supervising the installation of PROLLOY ROOF BARS and other roof support systems. A vehicle and expenses will be provided.

Write stating age, experience, qualifications and salary expected to:—

PRODUCT ENGINEER (MINING),
LLOYDS (BURTON) LIMITED,
Burton-on-Trent,
Staffs.

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AN established company in the Midlands which employs fully qualified Mining Engineers and is already selling exclusively to the East and West Midlands Divisions of the National Coal Board, wishes to represent additional manufacturers. Capable of introducing entirely new products or of adding momentum to the sales of existing ones. Box AE414, IRON AND COAL.

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MINING EXAMS.—Expert Coaching by Postal Tuition.—Apply UNIVERSAL MINING SCHOOL (Dept. R.), 50, Connaught Road, Cardiff.

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RAPIER 3-ton Super Diesel Electric Mobile Crane, on pneumatics.
JOSEPH PUGSLEY & SONS, LTD., Bristol, 5.
Tel.: Bristol 56037.
Grams.: "Piston," Bristol.

AIR COMPRESSORS for sale. 2,500 cu. ft. Belliss Morcom, 100 p.s.i., 550 h.p. motors; 2,300 c.f.m. Holland Rotary 25 p.s.i.; 525 c.f.m. Holman, 1940, 119 h.p.; 400 cu. ft. Broomwade EH245, new 1943, 90 h.p.;; 300 c.f.m. Broomwade EH240, 100 p.s.i., 60 h.p.; 250 c.f.m. Belliss Morcom, 100 p.s.i., 60 h.p. Also numerous others, and Air Receivers 1 ft. to 9 ft. dia., 100 to 1,000 lb. pressure.

LOCOS—Two Fowler 150 h.p. Diesel; 2 Barclay 80 h.p. diesel, 0-4-0; 2 Ruston 16 20 h.p. 24 in. gauge diesel; 2 Hudson 20 h.p. 24 in. gauge diesel; 4 Logan 3-4 ton 24 in. gauge, battery operated, including two flameproof.

E.O.T. CRANES—30 ton Marshall Fleming, 29 ft. 3 in. span, 480 v. D.C.; 25 ton girders and end carriages with 60 h.p. motors, 95 ft. 10 in. span; 25 ton Clyde, 21 ft. 9 in. span, new 1954; 20 ton Morris Goliath, 35 ft. span, 5 ton auxiliary; 20 ton King, 42 ft. 3 in. span, almost new; 20 ton Vaughan, unused, 42 ft. 3 in. span; 10 ton Heywood, 34 ft. span, unused; 2—10 ton, 60 ft. span, 1955; 5 ton, 37 ft. span, 1944; 5 ton King, 29 ft. 3 in. span; 4 ton Morris, 19 ft. span, 220 v. D.C.; 3 ton Morris, 149 ft. span, 4 motor, new 1954.

LOCO CRANES, STANDARD GAUGE—12½ ton Brownhoist steam, 50 ft. jib; 8 ton Wilson steam, 35 ft. jib; 5 ton Smith steam, 50 ft. jib (2); 5 ton Grafton diesel, 35 ft. jib (2); 3 ton Smith steam, 25 ft. jib.

STEEL AND CAST IRON PIPING—Most sizes, ½ in.—60 in., including 2, 3, 4 and 6 in. Victaulic, 1¼ in., 2½ in., 3 in. galvanised, 16 in., 20 in., 24 in., 26 in., 27 in. and 28 in. UNUSED BITUMEN LINED AND COATED WITH JOHNSON COUPLINGS. Special Parcels:
20,000 ft. 6 in. × 3/16 in., ¼ in., 5/16 in., unused steel seamless.
10,000 ft. 8 in. × ¼ in., unused steel seamless.
2,000 ft. 24 in. × ½ in., unused welded and seamless.
300 × 12 ft. lengths 10 in., unused, cast iron flanged.

List on request.
FRED WATKINS (ENGINEERING) LTD.
Coleford, Glos.
Tel.: Coleford 2271/5.

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600

DOUBLE drum mine HOIST by Nordberg Mfg. Co. U.S.A., arranged for electric motor drive through single reduction helical gears. Hoist designed to operate in balance in a vertical shaft and arranged for single electric motor drive initially, with dual motor drive ultimately. The drums, 8 ft. dia. × 5 ft. 2 in. face have sufficient capacity for winding 2,000 ft. of 1¼ in. dia. rope plus three dead wraps and ample footage for cutting in two layers. Depth 700/2,000 ft. initial/ultimate, load 11,025 lb., rope speed 900/1,800 ft./min. initial/ultimate. Present driving motor 500 h.p. wound for 3,300 volts 3 phase, 50 cycles supply.

750 h.p. ROLLING MILL MOTOR by Brown Boveri, wound for 2,200 volts 3 phase 50 cycles supply, speed 146 r.p.m., 0.75 power factor, continuously rated, suitable for reversing on load if required. Mounted on baseplate, with two pedestral ring oil lubricated bearings.

FOUR 400 h.p. ROLLING MILL MOTORS by the English Electric Co., wound for 400 volts 3 phase 50 cycles supply, speed 738 r.p.m., coupled to gearbox giving final 30 r.p.s. With barring motor, control gear.

Horizontal riveted AIR RECEIVER, 6 ft. dia. × 28 ft. 6 in. long, dish ended, working pressure 350 p.s.i. With fittings.

GEORGE COHEN
SONS & CO., LTD.,
WOOD LANE, LONDON, W.12.
Tel. Shepherds Bush 2070.

FOR SALE.

SECONDHAND Steel Sections, Channels, Angles and Joints. Secondhand Railway Material.

THE MOTHERWELL MACHINERY & SCRAP CO., LTD.
P.O. Box No. 15, INSHAW WORKS, MOTHERWELL.
Telephone: Motherwell 4536/7/8.
Telegrams: "Scrap" Motherwell.

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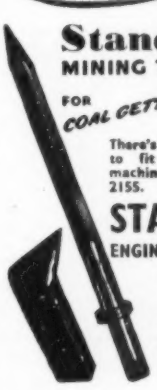

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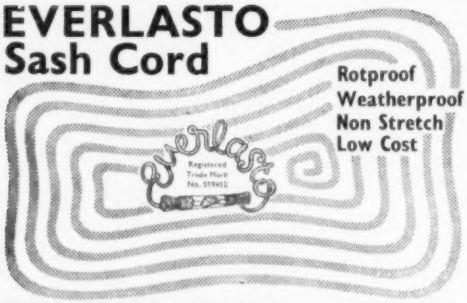

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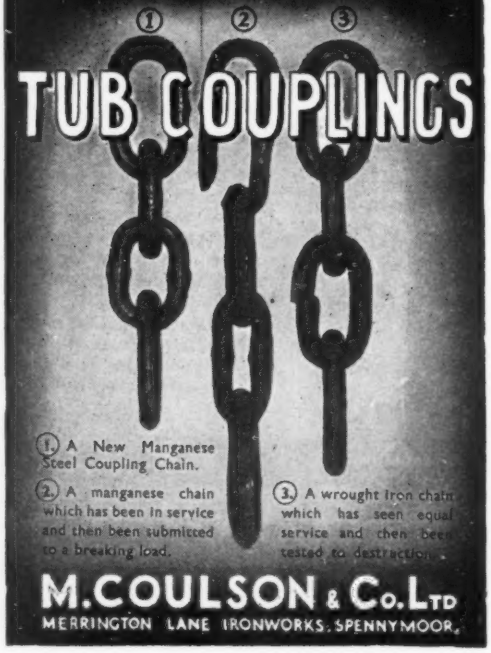

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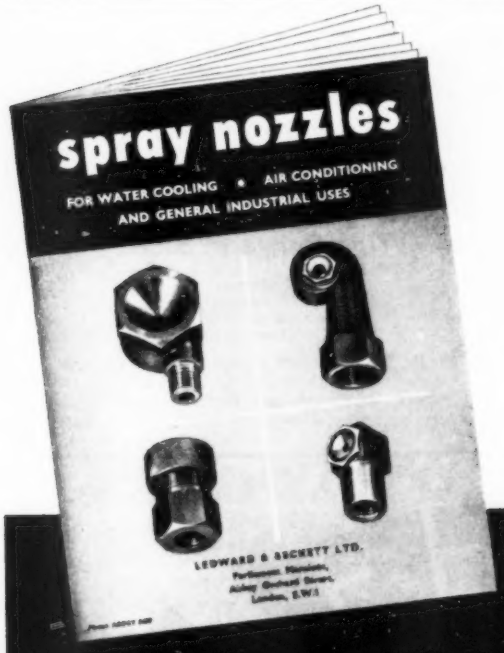

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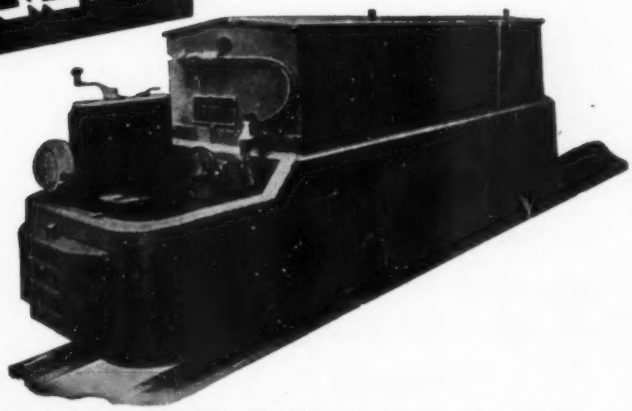

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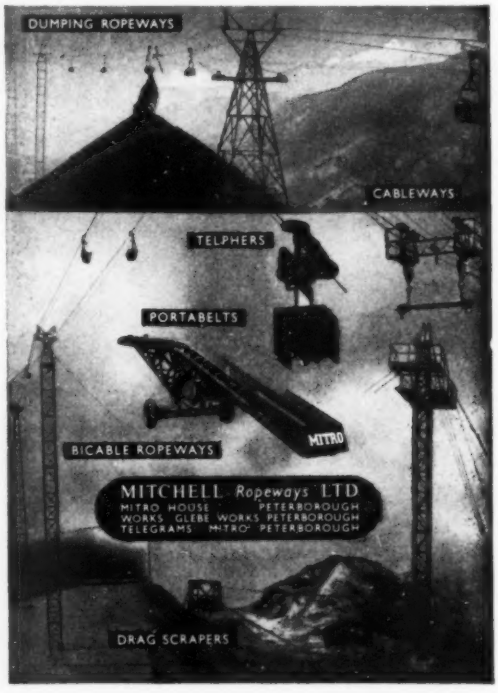

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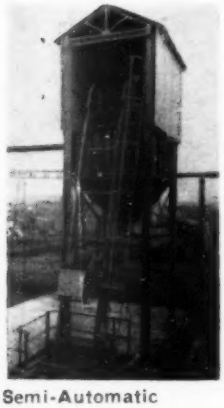

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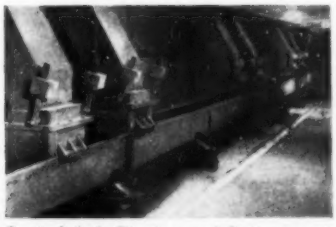

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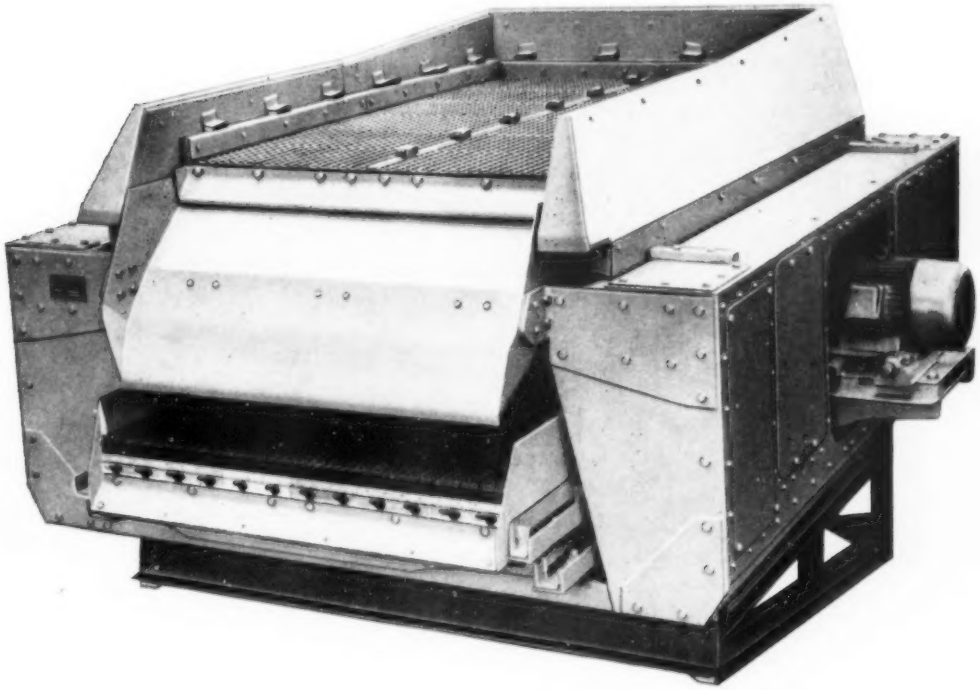

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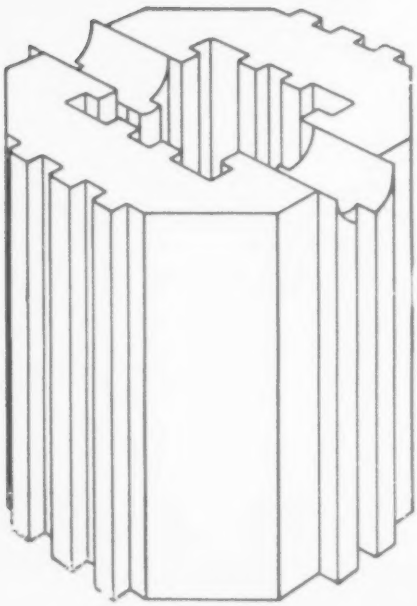

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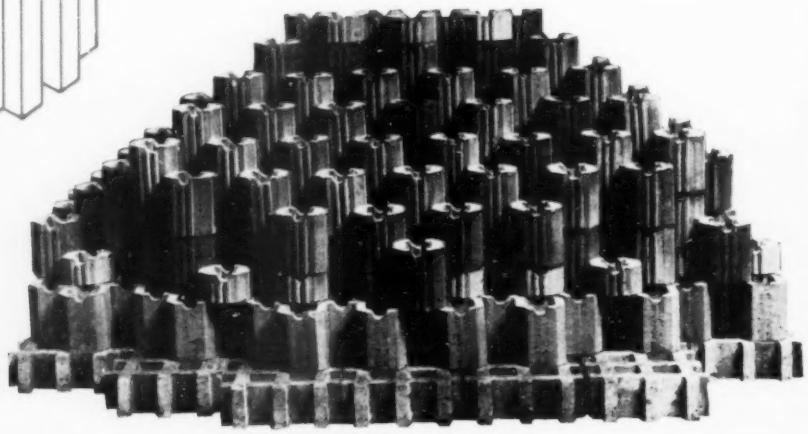

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